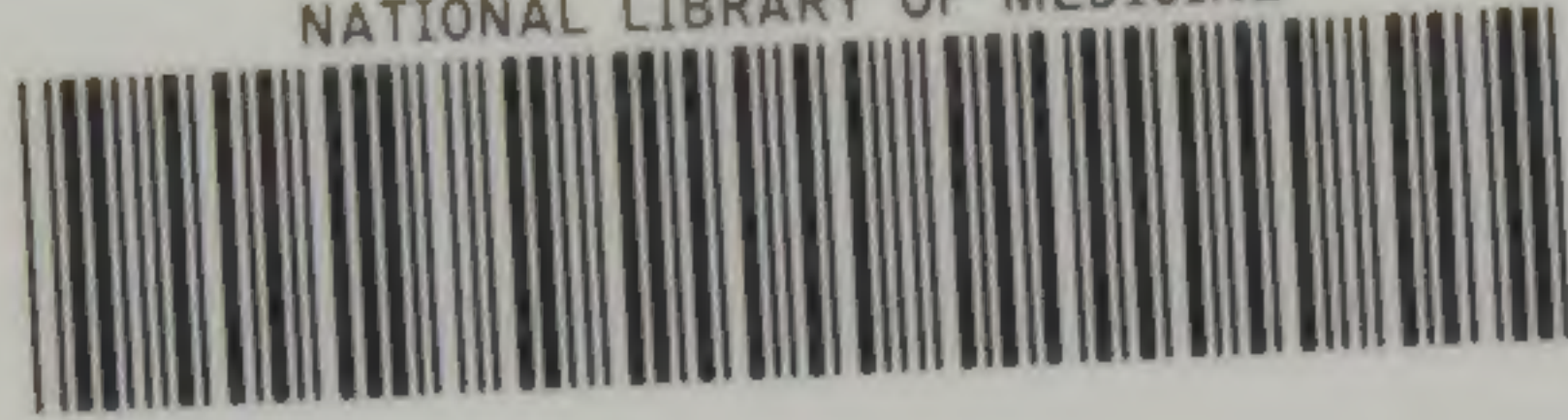


A SYLLABUS OF SURGERY
N. SENN, M.D.,

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PRACTICE OF SURGERY.

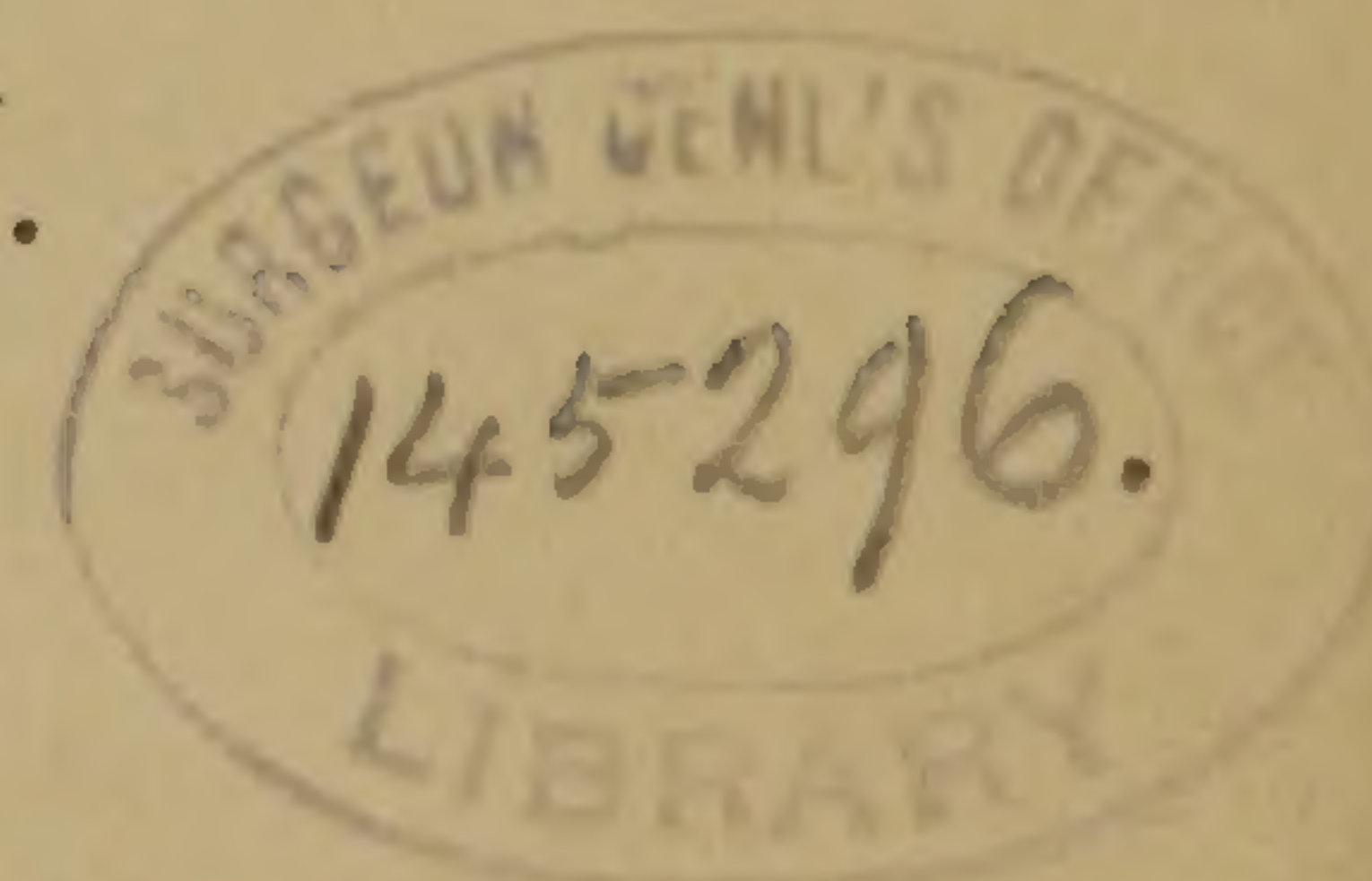
ARRANGED IN CONFORMITY WITH THE
AMERICAN TEXT-BOOK OF SURGERY.

BY N. SENN, M. D., PH. D., LL. D.,
CHICAGO,

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1893

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PREFACE.

EVERY teacher of surgery must have felt the need of some short guide to aid him in the lecture-room in presenting the various subjects in a systematic, clear, succinct, and practical manner. The student of surgery during his early college experience is often bewildered by what he hears and reads, and keenly experiences that want of something which should enable him to separate the chaff from the wheat, and to memorize facts which he is expected to retain and apply at the bedside during his future professional career. This little book has been written to meet these requirements. Its contents have been arranged in conformity with the *American Text-Book of Surgery*, which in less than a year has achieved an unparalleled popularity, both among teachers and students. Wherever I have found the text defective, I have added facts, names of authors and operations, while in other places subjects not belonging within the limits of the practice of surgery have been excluded. Recitations are gradually displacing didactic lectures, and it is the author's hope that the SYLLABUS will prove of special value for this method of instruction, as well as in the preparation of the student for the final examinations. I desire to thank my friend, Surgeon A. C. Girard, U. S. A., for reading the galley-proof.

N. SENN.

CHICAGO, August, 1893.

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SYLLABUS OF AMERICAN TEXT-BOOK OF SURGERY.

HEART AND PERICARDIUM.

Heart.	Location injuries.	Rupture.	{ Obstruction of coronary arteries. Over-distention.
		Wound.	{ Gunshot. Stab. { Symptoms, prognosis, treatment.
	Carditis.—Traumatic, metastatic, primary purulent.		
Pericardium.	Tapping of right auricle.	{ Indications and technique.	
	Structure.	{ Symptoms and signs.	
	Serous effusion.	{ Prognosis. Paracentesis pericardii.	
	Suppurative pericarditis.	{ Traumatic. Metastatic. Incision and drainage.	

VEINS.

Structure.	{	Coats.
		Valves.
Wounds.	{	Hemorrhage.—Color of blood-stream.
		Complications.
		Treatment.

{	Thrombosis.
	Œdema.
	Arterio venous, aneurysm.
	Ligation.
{	Lateral ligation.
	Compression.

Phlebitis. { Acute. { Symptoms. { Pain, tenderness, swelling, discoloration.
 { Subacute. { General symptoms.
 { Treatment. — Rest, local applications, incision, general treatment.

Veins most frequently affected.—Internal saphenous, hemorrhoidal, subcutaneous, abdominal, veins of the spermatic cord.

VARIX AND NÆVUS.

Varix. { Morbid anatomy.—Thickening, attenuation, periphlebitis, phlebitis, ulceration, thrombosis.
 { Etiology.—Age, sex, obstruction, occupation.
 { Diagnosis.
 { Treatment. { Palliative. { Removal of cause.
 { Elastic bandage.
 { Prevention of ulceration.
 { Radical. { Open ligation.
 { Subcutaneous section.
 { Injection of carbolic acid.
 { Subcutaneous ligation (Phelp's).
 { Enucleation or excision (Modelling).

Nævus. { Location.
 { Size.
 { Symptoms.
 { Prognosis.
 { Treatment. { Ligation, excision.
 { Coagulating injections.
 { Ignipuncture.

ARTERIES AND ANEURYSM.

Arteritis. { Endarteritis. { Acute. { Symptoms.
 { Mesarteritis. { Chronic. { Treatment. { Prophylactic.
 { Periarteritis. { Antirheumatic.
 { Specific.

Degeneration. { Atheroma.
Calcification.

Aneurysm.

- Definition.—Arterial varix, dilatation and elongation of an artery.
- Varieties. Cirroid aneurysm. { A number of arteries.
Paralysis of vaso-motor nerves.
- Idiopathic. { Tubulated. } True.
{ Sacculated. } False. { Circumscribed.
{ Dissecting. } { Diffused.
- Termination. { Spontaneous } Obliterate blood-clot.
{ cure. } { Inflammation.
- Etiology. { Predisposing. { Degeneration, syphilis, violent exercise.
Age, sex.
Overaction of heart. { Rupture. { External.
Internal.
Pressure. { Respiratory tract.
Inflammation. { Alimentary tract.
Spinal cord and nerves.
- Exciting. —External violence, wounds, strains, fractures, and dislocations.
- Symptoms. { Bruit.
Pulsation, effect of pressure. { Proximal side.
Distal side.
Pain. { Distal swelling.
Œdema.

TRAUMATIC ANEURYSM.

Etiology. { Arterial wound.
Extravasation of blood.
Compression of tissues.

Symptoms. { Swelling immediately after injury.
Absence of peripheral pulse.
Characteristic symptoms of aneurysm.

Treatment.	<ul style="list-style-type: none"> Incision and ligation on both sides of wound. Use of Esmarch's bandage. Digital compression after incision.
Aneurysmal varix.	<ul style="list-style-type: none"> Communication between artery and vein without the interposition of a sac. Symptoms. <ul style="list-style-type: none"> Whizzing or purring sound. Small distal pulse. Enlargement of vein. Etiology. <ul style="list-style-type: none"> Punctured wounds. Pistol-shot wounds. Treatment. <ul style="list-style-type: none"> Elastic bandage. Pressure.—Artery above, vein below, over swelling. Extirpation with double ligation of artery and vein.
Varicose aneurysm.	<ul style="list-style-type: none"> Same as aneurysmal varix, but with interposed sac. Treatment: Extirpation of sac with double ligation of both artery and vein. Double ligation of artery without excision of the sac (Spencer).
Differential diagnosis.	<ul style="list-style-type: none"> Abscess. Pulsating sarcoma. Tumor overlying large vessels.
Prognosis.	<ul style="list-style-type: none"> Character of the aneurysm. Nature of the surrounding parts. Habits and manner of living of patients.
Medical.	<ul style="list-style-type: none"> Langenbeck's injection of ergotin. Potassic iodide. Potassic bromide. Tufnell's method.—Rest, diet, and medicinal.
Compression.	<ul style="list-style-type: none"> Direct (Heister-Guatlaní, 18th century). Proximal (Hunter, Desault, 1785). Instrumental—tourniquet. <ul style="list-style-type: none"> Signorini. Skeg.
Treatment.	<ul style="list-style-type: none"> Digital. <ul style="list-style-type: none"> Knight, 1848. James R. Wood. W. Parker. Shot-bag.

Surgical treatment.	{	Flexion of part (Hart, 1858).
		Elastic compression (Murray, 1864; Reid, 1875).
		Ligation method of Rutylus: incision, double ligation.
		“ “ Auel, 1710: proximal ligation near the sac.
		“ “ Jno. Hunter, 1785: proximal ligation distant from the sac.
		“ “ Brasdor: distal ligation.
		“ “ Wardrop: one or more distal ligatures.
		Foreign body in the sac (silver wire, 1864).
		Manipulation (Fergusson).
		Galvano-puncture (Phillips).
		Acupuncture.
		Excision and amputation.
		McEwen's method.

ANEURYSMS OF SPECIAL ARTERIES.

ARTERY.	TREATMENT.
Carotid.	{ Proximal or distal ligation. Double ligature and excision.
Subclavian.	{ Digital compression. Distal ligation. Double ligation and excision.
Axillary.	{ Proximal compression. Proximal ligation. Proximal pressure and distal elastic compression. Double ligation and excision.
Brachial.	— Double ligation and excision.
Iliac.	{ Proximal compression. Proximal ligation of common iliac; laparotomy.
Gluteal.	{ Proximal compression. Laparotomy and proximal ligation.
Femoral.	{ Proximal compression. Double ligation and excision. Proximal ligation.

ARTERY.	TREATMENT.
Popliteal.	{ Genufluxion.
	{ Proximal ligation.
	{ Double ligation and excision.
Aorta.	{ MacEwen's operation.
	{ Introduction into sac of silver wire.

INJURIES OF BLOOD-VESSELS.

HEMORRHAGE.		
Anatomical divisions.	—Arterial hemorrhage; venous hemorrhage; capillary hemorrhage; parenchymatous hemorrhage.	
Clinical varieties.	{ Primary, at time of injury; intermediary, during reaction first twenty-four hours; secondary, twenty-four hours before organization of thrombus.	
General symptoms.	{ Pulse, rapid and feeble; temperature, subnormal; respiration, frequent and irregular.	
	{ Pallor of surface and lividity of lips and finger-ends.	
	{ Dilatation of pupils, alæ nasi.	
	{ Nausea and vomiting.	
	{ Syncope, unconsciousness and convulsion.	
Spontaneous arrest.	—Contraction and retraction of vessel ends; thrombosis.	
Diagnosis.	—Open hemorrhage; occult or internal hemorrhage.	
Treatment.	General.	Stimulants.—Strychnia, digitalis, ammonia, ether, alcohol.
		Ergot.
		External heat.
		Position of patient.
		Autotransfusion.
		Transfusion.
		Infusion.
		Compression.
		Actual cautery.
		Ligation.—Silk, catgut, kangaroo tendon.
	Local.	Torsion.
		Acupressure.
		Hot water.
		Ice.
		Position.

ACUTE PERIOSTITIS AND OSTEOMYELITIS.

Anatomical remarks.	{	Periosteum.	{ External fibrous layer Internal layer or cambium.
		Medulla.	{ Central. Haversian canal.
Periostitis.	{	Blood-vessels.—Nutrient artery from periosteum.	
		Rare as a primary affection.	
	{	Chronic form.	{ Tuberculosis. Syphilis.
		Etiology.	{ Anatomical predisposing conditions. { Imperfect blood-vessels. Epiphyses. Pus-microbes. { Direct infection. Through circulation. Acute infections. { Typhoid fever. Diseases and exposure to trauma. { Scarlatina. Rubeola. Variola.
Osteomyelitis.	{		Symptoms.
		Differential diagnosis.	{ Typhoid fever. Rheumatism. Multiplicity of affection. { Delirium. Tongue. Intensity of general symptoms. { Pulse. Temperature.
	{	Prognosis.	{ Complications. { Joint affections. Pyæmia.
		Treatment.	{ Elevation and fixation of limb; application of cold; early operative treatment, use of chisel and spoon; disinfection of primary focus; tamponade of cavity with iodoform gauze.

NECROSIS.

Separation of sequestrum.	{	Superficial. Central. Tubular. Complete.
Formation of involucrum.	{	Formation of new bone around the sequestrum. Cloaca.
Digestion of sequestrum.	{	Dilute muriatic acid. Pepsin and acid.
Treatment. Sequestrotomy.	{	Locating sequestrum; use of Esmarch's bandage; external incision; opening of involucrum; removal of sequestrum; removal of granulations; disinfection; packing with decalcified bone chips; closure of the wound.

CHRONIC AFFECTIONS OF BONE.

Chronic suppurative osteomyelitis.	{	In scar of former acute attack as a primary affection.	{	Bone absorption.	{	Symptoms.—Pain, often intermittent. Treatment. { Exposure of abscess. Disinfection of cavity. Bone packing. Suturing of wound.
Tubercular osteomyelitis.	{	Etiology. { Symptoms. { Pathology. {	{	Tuberculosis of other organs. Age. Epiphyses of long bones. Trauma. Pain. Tenderness. Affection of adjacent joints. Granulation. Infarcts, wedge-shaped sequestrum. Caseation. Tubercular abscess. Osteoporosis. Osteosclerosis.		

Tubercular osteomyelitis (continued).	{	Prognosis.	{	Extent and location of disease.	
		Treatment.	{	General.	{
{	Tuberculosis of other organs.				
	{	Amyloid degeneration of other organs.			
{		Operative.	{	Parenchymatous injection of iodoform.	
	Ignipuncture.				
Sarcoma.	{	Periosteal.	{	Peripheral.—	Formation of new bone.
Syphilitic periostitis and osteomyelitis.	{	Symptoms.	{	Pain (nocturnal), tenderness.	
					Formation of new bone.
Atrophy of bone.	{	Treatment.—	Specific.	{	Bichloride of mercury.
Caries.—Ulceration of bone caused by foregoing affections.	{	Hypertrophy of bone.	{	Result of chronic plastic processes.	
					Giant growths.
Osteomalacia.	{	Pathology.	{	Increased vascularity.	
					Stimulation of earthy salts.
	{	Treatment.	{	Tonics.	
					Rest.
	{		{	Castration.	

Fragilitas ossium.	{	Etiology.	{	Insanity.
			Tabes.	
			Paralysis.	
			Heredity.	
	{	Treatment.	{	General.
			Prevention and treatment of pathological fractures.	
			{	Inflammatory.
				Osteomata.
Tumors of bone.	{	Fibroma.	{	Skull.
			Maxillary bones—epulis.	
			Naso-pharynx.	
			Chondromata.	{
Feet.				
Femur.				

FRACTURES.

Classification.	{	Incomplete.	{	Fissures.	{	Separate lesion.		
					{	With other fractures.		
					{	Bending.		
					{	Partial fracture.		
					{	Impaction.		
		{	Subcutaneous simple fracture.	{	Separation, splinter, or apophysis.	{	Direct force.	
					{	Traction.		
					{	Transverse.		
					{	Oblique.		
					{	Longitudinal.		
				{	{	Seat of fracture.	Dentate.	
							V-shaped.	
							{	Shaft of long bones; neck; intercondyloid;
							{	apophysis; epiphyseolysis.
							{	Femur.
	{	Intra-articular.		{	Humerus.			
			{	Radius.				

Classification (continued).	{	Multiple fracture.	{	In separate bones.	{	Comminuted.
				In same bones.		Impacted.
		Compound fractures.	— External wound; internal wound; gunshot fractures.			
		Complicated fracture.	— Injury of large nerve-trunk; injury of large blood-vessel.			
		Pathological fracture.	— Osteoporosis; osteomyelitis; sarcoma; carcinoma; parasites.			
Displacements.	{	Lateral.				
		Angular.				
		Rotary.				
		Overriding.				
		Impaction.				
		Longitudinal.				
Etiology.	{	Predisposing.	{	Physiological.	{	Long bones.
						Age.
						Heredity.
						Inactivity; atrophy.
				{	Osteoporosis.	
					Osteomalacia.	
					Scorbutus.	
					Rachitis.	
		Pathological.	{	Disease of nerve-cells.		
				Syphilis.		
				Carcinoma.		
				Sarcoma.		
				Osteomyelitis.		
				Parasites.		
Exciting.	{	External violence.—Direct; indirect.	{	Patella.		
				Olecranon.		
		Muscular contractions.	{	Coracoid.		
				Coronoid.		
				Humerus (5 per cent.).		
				Femur (15 per cent.).		
				Leg (8 per cent.).		
				Forearm (5 per cent.).		

Intra-uterine fractures. { External injury.
 { Uterine contractions.
 { Malformations.
 { Syphilis.
 { Osteomyelitis.

CALLUS PRODUCTION.

Historical notes. { Period of Galen.—Succus ossificans.
 { Period of Duhamel (1740 to 1820).—Periosteum and endosteum.
 { Period of Dupuytren. { Periosteum.
 { Bone.
 { Surrounding tissues.
 { Period of Virchow.—Histogenetic origin.

Modern views. { Group.— { Periosteum.
 { Medulla.
 { Connective tissue. { Virchow.
 { C. O. Weber.
 { Gurlt.
 { Billroth.
 { Volkmann.
 { Rokitansky.
 { Lassen.
 { Hofmoke.
 { Lebert.
 { Maas.

Group.—Bone-tissue.

Group.—Periosteum.

Macroscopical appearances. { Laceration of soft parts.
 { Extravasation of blood.
 { Hyperæmia.
 { Osteoporosis.
 { Inflammatory exudate.
 { Architectural structure of callus.
 { Medullary canal.

Callus. { Periosteal, as osteoid and metaplastic.
 { Medullary, as osteoid transformation and metaplastic ossification.
 { Intermediate (Breschet).

Histogenesis.	<ul style="list-style-type: none"> { Hyperæmia. { Inflammation. { Cell implantation. { Osteoblasts. } Direct ossification. { Basis substances. } { Medullary spaces. { Cartilage-cells—metaplastic ossification. { Formation of lamellæ. { Osteoclasts. { Osteoporosis. { Absorption of callus.
Theory of callus production.	<ul style="list-style-type: none"> { Leucocytes.—Cohnheim and Maas. { Medullary tissue. { Gegenbauer. { Kölliker. { Waldeyer. { Bruns. { Periosteum. { Transplantation experiment. { Subperiosteal resection. { Connective tissue.—Billroth and Heine.
Excessive production of callus.	<ul style="list-style-type: none"> { Age. { Seat of fracture. { Extensive injury of soft parts. { Incomplete reduction. { Imperfect immobilization.
Defective production of callus.	<ul style="list-style-type: none"> { Suppuration. { Scanty covering of soft parts. { In joints. { Defective local and general nutrition. { Lateral displacements. { Longitudinal displacements.

Symptoms and diagnosis.	Subjective symptoms.	{ Diminution or loss of function. { Mechanical causes. { Pain. { Pain. { History of case. { Paralysis. { { Spontaneous. { { Tenderness. { { Previous fracture. { { Manner of injury. { { Age. { { Condition of bones.
	Objective symptoms.	{ Deformity. { Inspection. { Swelling. { { Displacements. { { Ecchymoses. { { External wounds. { { Measurement. { { Comparison. { { Akeido-peurastic. { Preternatural mobility. { Abnormal motion. { { New point of motion. { Crepitation. { When present. { { When absent.
	Symptoms following fracture.	{ Shock. { Swelling. { Local. { Ecchymosis. { { Bullæ. { { Pain. { General fever. { Fermentation. { { Sepsis. { { Suppuration. { Fat embolism. { Urine. { Osteomyelitis. { Time of repair. { Time for restoration of function.

Treatment of compound fractures.	Advantages of antiseptic treatment.	<ul style="list-style-type: none"> Reduction of mortality from 75 per cent. to 2 per cent. Increased sphere of conservative surgery. Shortened time of treatment. Improved functional results. Diminished suffering.
	Old methods of treatment.	<ul style="list-style-type: none"> Exclusion of air by compress of charpie. Open wound treatment (Burrow and Rose). Healing under blood-clot (A. Cooper). Debridement (Larrey). Occlusion plaster dressing (Chassaignac). Cotton dressing (Guerin). Cotton dressing and fixation of fragments (Ollier). Cotton dressing and collodion (Guyon). Permanent irrigation (Breschet). Permanent immersion (Langenbeck).
	Modifications of antiseptic dressings.	<ul style="list-style-type: none"> Lister dressing. Dry carbolized jute (Minich). Moist carbolized jute (Bardeleben). Salicylated cotton (Thiersch). Chloride of zinc (Kocher). Iodoformization (Mikulicz). Sublimated moss. Sublimated wood wool. Permanent antiseptic irrigation.—Acet. aluminium.
	Technique of antiseptic treatment.	<ul style="list-style-type: none"> Recent fracture from indirect force. <ul style="list-style-type: none"> External disinfection. Closure of wound. Antiseptic occlusion dressing. Permanent fixed dressing. Change of dressing.

Treatment of compound fractures (continued).	Technique of antiseptic treatment (continued).	Recent fracture from direct violence.	Thorough external and internal disinfection. Enlarging wounds. Counter-openings. Debridement. Drainage. Drainage of joint if implicated. Antiseptic occlusion dressing. Equable compression. Iodoformization. Change of dressing.
		Not recent fracture wound—infected.	Thorough external and internal disinfection. Removal of necrosed tissues. Removal of extravasation. Free drainage. Iodoformization. No occlusion dressing. No compression. Permanent antiseptic irrigation.
	Reduction.		
		Plastic splints.	Plaster of Paris. Felt. Gutta-percha. Pasteboard.
	Retention of fragments.	Direct fixation of fragments.	Silver wire. Iron or bone nails. Ivory cylinder in medullary canal.
		Suspension of limb. Posterior hollow splint. Permanent extension. Circular fenestrated plaster splint. Interrupted plaster splint.	
	Amputation.		

Indications for amputation.	{	Primary.	{	External crushing of soft parts.	{	Injury of large blood-vessels.
			{	Serious complications.		Injury of large nerves.
		Intermediate, 2 to 5 days.	{	Gangrene.	{	Uncontrollable hemorrhage.
			{	Secondary hemorrhage.		
			{	Acute purulent œdema.		
	{	Secondary.	{	Diffused suppuration.		
			{	Purulent arthritis.		
			{	Diffuse osteomyelitis.		
			{	Secondary hemorrhage.		
			{	Tetanus.		
			{	Septicæmia.		
			{	Pyæmia.		
Contraindications.	{	Shock.				
		Acute anæmia.				
Indications for resection.	{	Primary.	{	Typical: comminution of articular ends.		
			{	Atypical: joint wounds with fracture.		
		Intermediate.—	When asepsis has failed.			
		Secondary.	{	Exhaustion; prolonged suppuration.		
			{	Chronic arthritis.		
Remote consequences of fracture.	{	Stiffness of joint.	{	Malposition of fragment.		
				Exuberance of callus.		
				Arthritis.		
				Tenonitis.		
	{	Atrophy of limb.	{	Adhesion of muscles or tendon to callus.		
				Trophic changes.		
				Prolonged inactivity.		
				Compression.		
	{	Thrombosis and embolism.	{	œdema of limb.		
				Thrombo-phlebitis.		
				Pneumonia.		
				Embolism of pulmonary artery.		

Remote consequences of fracture (continued).	Fat embolism.	<ul style="list-style-type: none"> Flournoy (1864). Busch. Wagner. Riedel. Virchow.
	Hemorrhage.	<ul style="list-style-type: none"> Extravasation. Secondary. <ul style="list-style-type: none"> Arterial. Venous. Traumatic aneurysm.
	Gangrene.	<ul style="list-style-type: none"> From infection. From injury to vessels and nerves. From pressure of fragments.
	Traumatic emphysema.	<ul style="list-style-type: none"> Fracture of rib. Fracture of larynx or trachea. Fracture of bones of face.
	Destructive infection.	<ul style="list-style-type: none"> Suppuration. Osteomyelitis. Necrosis.
	Nervous system.	<ul style="list-style-type: none"> Muscular spasm. Delirium tremens. Delirium neurosum.
	Prolonged dorsal position.	<ul style="list-style-type: none"> Hypostatic pneumonia. Decubitus.
	Exuberant and painful callus.	<ul style="list-style-type: none"> Comminution. Imperfect reduction. Imperfect immobilization. Excessive plastic inflammation. Neuralgia. Compression of nerves. Neuritis.
	Paralysis.	<ul style="list-style-type: none"> Nerve-injury. <ul style="list-style-type: none"> Division. Laceration. Contusion. Compression by callus or displaced fragments.

General treatment of fractures.	{	{	{	{	First duties of a surgeon.	{ Shock. Hemorrhage. Primary dressing.—Simple fracture; compound fracture. Transportation. Bed. Examination and diagnosis.					
					Reduction of fracture.	{ Muscular relaxation.—Position; anesthesia. Extension. Counter-extension. Coaptation.					
					Retention.	{	{	{	{	Scultetus bandage. Bivalve cushion. Padded wooden splint. Fracture box. Posterior splint.	
										Movable dressing.	Suspension. { McIntyre. N. R. Smith. Hodgen.
										Immovable dressings.	Malgaigne's. { Hook. Spear.
											Angerer's alternate pressure.
											Plastic splint. { Pasteboard; leather; felt; gutta-percha; plaster of Paris.
											Circular plaster-of-Paris splint. Starch bandage. Dextrine. Silicate of soda.
										Removable fixed dressing.	{ Removable. Permanent. Splints.
										Double inclined plane.	{ Weight and pulley. Elastic.
										Permanent extension.	

Delayed union and pseudarthrosis.	{	Delayed union.	{	Slow production of reparative material.		
			{	Slow transformation of reparative material into bone.		
	{	Pseudarthrosis.	{	Ligamentous union.	{	Longitudinal displacement.
					{	Overriding fragments.
	{	True joint at seat of fracture.	{	Imperfect ossification.		
					{	Absorption of bone.
	{	Frequency and location of false joints.	{	Absorption of callus.		
				{	Anatomical location.	
{	Ætiology.	{	General causes.	{	Rachitis.	
						{
{	Local causes.	{	Faulty treatment.	{	Pregnancy.	
						{
{	Faulty treatment.	{	Application of cold.			
					{	Imperfect reduction.
{	Early passive motion.					
			{	Imperfect immobilization.		
{	Early use of limb.					
			{	Circular compression.		
{	Early use of limb.					
			{	Early passive motion.		
{	Early use of limb.					
			{	Early use of limb.		

Delayed union and pseudarthrosis (continued).	Treatment.	Delayed union.	Immovable dressing. Removal of cause. { Local. General. Descending galvanic current (Broca). Transformation into recent fracture. Walking apparatus (H. H. Smith). Subcutaneous scarification. Acupuncture. Acupuncture and galvanism. Seton (physic).
		Pseudarthrosis.	Perforation of bone ends. { Dieffenbach, 1845. Detmold. Brainard. Ivory pegs (Dieffenbach, 1846). Cauterization of bone ends. Resection of bone ends (White, 1760). Resection of bone ends with fixation. Volkmann's step operation. Impaction of fragments. Transplantation of bone.
Vicious union.	{ Manual impaction. Osteoclasia. Osteotomy.		

SPECIAL FRACTURES.

Superior maxilla and malar bones.	{ Produced by direct violence (are generally comminuted). Union takes place with great rapidity. Reposition by direct pressure. No retentive dressing required except in the case of the alveolar border. Alveolar border should be kept in position by wiring teeth or by opposite bone.
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Nasal bones.	<ul style="list-style-type: none"> Fracture caused by direct violence. Fracture may extend to ethmoid, and is then attended by special danger. Emphysema at seat of fracture. Repair takes place rapidly. Reduction by intranasal pressure. If retentive apparatus is required use transfixion pin. Suppuration may result in necrosis. Antiseptic treatment required to prevent such an occurrence. Treatment of old fractures attended by deformity.
Lower jaw.	<ul style="list-style-type: none"> <ul style="list-style-type: none"> Etiology. <ul style="list-style-type: none"> Fracture may be single or double. Fractures of the body of this bone are usually compound. Coronoid process seldom the seat of fracture. Displacements. <ul style="list-style-type: none"> Level of teeth lower on one side than the other. Antero-posterior and lateral displacement. Cause. <ul style="list-style-type: none"> — Violence received upon the chin or cheek. <ul style="list-style-type: none"> Diagnosis. <ul style="list-style-type: none"> Careful examination of dental arch. Abnormal mobility and crepitus. Bleeding from gums and looseness of adjoining teeth. In fracture of ramus pain on pressure or mastication. Course. <ul style="list-style-type: none"> Bone union with more or less deformity is the rule. Suppuration is often followed by necrosis and delayed union. Reduction and retention of fragments. <ul style="list-style-type: none"> Reduction is easily accomplished by well-directed pressure. Use of four-tailed bandage. Direct fixation of fragments by interdental splint or wiring of teeth or bones.
Hyoid bone.	<ul style="list-style-type: none"> Exceedingly rare fracture, and always caused by direct violence. Always implicates one of the greater cornua. Attended by sharp pain, swelling, dysphagia, and sometimes bleeding from mouth. Death from œdema of glottis may occur.

- Sternum.** { This fracture is rare; may be incomplete, multiple, transverse, longitudinal or oblique.
 { Transverse fracture at junction of manubrium and body of bone most frequent.
 { Displacement usually slight.
 { In fractures of upper portion second rib usually remains in contact with manubrium.
 { Fracture caused by violent straining, bending of trunk backward and direct violence.
 { History of case and point of pain and tenderness important in diagnosis.
 { Dyspnœa and irregularity of heart sometimes are present.
 { Reduction by direct pressure, aided if necessary by extension of trunk and deep inspiration.
 { Retention by broad band of adhesive plaster around chest.
- Ribs.** { Fracture of ribs is of frequent occurrence.
 { It may be partial, complete, single or multiple.
 { Ribs most frequently broken are the fifth to the ninth.
 { Floating ribs are seldom if ever fractured.
 { Unless more than one rib is broken displacement is slight.
 { Complicating injury to lung by the sharp point of fragment is common.
 { This accident is attended by emphysema, pneumothorax and hemoptysis.
 { Fracture usually produced by indirect or direct violence.
 { Pain is aggravated on deep inspiration, on coughing and pressure.
 { Abnormal mobility and crepitus.
 { Reduction of displaced fragments by direct pressure.
 { Retention of fragments is secured by including chest in circular dressing.
- Costal cartilages.** { Caused by direct or indirect violence or by muscular action.
 { Most frequently near junction with rib, and involves most frequently the seventh and eighth cartilages.
 { Diagnosis and treatment same as fracture of the ribs.
- Clavicle.** { More frequently broken than any other bone, with possible exception of radius.
 { More frequent in children than adults.
 { Fracture may be partial greenstick, complete, simple, compound, single or multiple.
 { Usual seat in the middle third of the bone.
 { The classification into fractures of the inner, middle and outer thirds is based on anatomical and clinical differences.

Clavicle (continued).	{	Middle third.	{ May be oblique or transverse; latter form is found mainly in children. Line of oblique fracture runs from above downward and inward. Shoulder falls downward, forward and inward. Outer fragment under inner one, thus raising broken end of the latter. In transverse fracture displacement slight, and is transverse or angular.
		Outer third	{ Much less frequent than the preceding. Line of fracture is more often transverse than oblique. Displacement usually angular with apex directed backward.
		Inner third.	{ Quite rare; line of fracture is commonly oblique. Displacement of outer fragment is inward and downward. Inner fragment either pressed upward or forms part of angularity.
		Complications.	—Are very rare; injury to large vessels, nerves, and lungs.
		Simultaneous fracture of both clavicles.	{ Caused by direct or indirect violence. Dyspnœa from weight of shoulders on chest has been observed in some cases.
		Causes.	{ Indirect violence, fall upon hand or shoulder; muscular action, as in lifting or striking; direct violence.
		Symptoms.	{ Pain, deformity, abnormal mobility, and loss of function. Crepitus is not present in greenstick fracture. Arm is held in abducted position.
		Course.	{ Union usually takes place within a month. Deformity due to shortening and angular displacement is the rule. Excessive size of callus has produced pressure-effects on nerves and skin.
		Treatment.	{ Reduction by drawing shoulder upward, backward, and outward. Aided when necessary by pressure upon projecting angle at point of fracture. Shoulder should be held in position, as redisplacement takes place by its weight. In transverse and in complete fractures a mitella will answer the purpose. Dorsal decubitus, with a firm and narrow pad between shoulders and forearm resting on chest.
			{ Sayre's dressing is applicable in the majority of cases.
			{ Antiseptic cotton should be placed between parts which are brought in contact.
			{ Velpeau's dressing is less reliable than Sayre's.
			{ Plaster-of-Paris dressing as a support for the shoulder.
			{ If fracture is near acromial end a strip of plaster passing under elbow and crossing on top Non-union of fracture of the clavicle. [of shoulder.
			{ Operative treatment of exuberant callus.

Scapula.	Line of fracture.— Body ; inferior angle ; upper angle ; spine ; acromion ; coracoid process ; neck ; glenoid fossa.	
	Body.	Caused by direct violence.
		If line of fracture is single, either fragment may project outwardly and override the other.
		Fracture cannot be found by direct examination.
		Immobilization of shoulder and arm.
	Inferior angle.	Caused by direct violence or muscular action.
		Lower fragment displaced forward and upward.
		Reduction and immobilization difficult ; ligamentous union the rule.
	Upper angle.	Very rare, and always produced by direct violence.
		Displacement slight ; treatment by immobilization.
	Spine.	Entire spine, including acromion, may be separated.
		Cause, direct violence ; separation slight ; immobilization.
	Acromion.	Caused by direct violence or muscular action of deltoid.
		Prominent symptoms : Pain, tenderness, suggillation, abnormal mobility, and crepitus.
		Non-union of epiphysis with contusion may be mistaken for fracture.
		Treatment by immobilizing arm in Velpeau's position.
	Coracoid process.	Bony union is the exception.
		May be caused by external violence or muscular action.
		Displacement downward of fragment, abnormal mobility, and crepitus are the most important symptoms.
		Immobilization of arm upon side of chest with elbow backward constitutes the treatment.
	Neck.	Bony union is seldom if ever obtained.
		Fracture of surgical neck includes all cases in which disturbed fragment includes long head of biceps.
		Flattening of shoulder most prominent symptom ; this disappears when arm is pressed upward.
		A part swelling ; the depressed outer fragment can be felt in the axilla.
	Rim of glenoid fossa.	Bony union with some displacement is the rule.
		Treatment same as in fracture of outer third of clavicle.
		Is a complication of dislocation of the shoulder.
		A stellate fracture of glenoid fossa, the result of crushing violence acting through head of humerus, has been described.
		Fracture of rim complicating dislocation predisposes to redislocation.
		Treatment consists in supporting arm, shaft of humerus inclined in opposite direction.

Fractures of the humerus.

Constitute about 8 per cent. of all fractures.

Fractures of the upper end.	Clinical varieties.	— Upper end; shaft; lower end.
	Head.	{ Very rare accident. It cannot be recognized clinically.
	Anatomical neck.	{ Quite rare. Majority of cases occur in connection with anterior dislocation. May be caused by direct or indirect force. If associated with dislocation, head moves independently. Crepitus in rotation of arm; tuberosities intact. Immobilization of arm with traction. Folded towel in axilla and shoulder cap.
	Tuberosities.	{ More frequent than fracture through anatomical neck. Line of fracture usually marking greater tuberosity. Fragments commonly comminuted and impacted. Late tendency to displacement of head. Treatment same as for fracture through anatomical neck.
	Greater tuberosity.	{ Complete or partial rarely seen except in connection with anterior dislocation. May be caused by direct violence or muscular contraction. Line of fracture runs from anatomical neck to bicipital groove and through or below tuberosity.
	Lesser tuberosity.	{ Symptoms are: Pain, crepitus, swelling, and loss of voluntary outward rotation. Only three cases on record. Two of these in connection with very rare dislocation of shoulder upward. Caused by external violence, and in new-born by traction upon arm. Displacement is either transverse or angular. The apex of the angle is directed forward and upward.
	Separation of epiphysis.	{ In complete lateral displacement lower fragment lies on inner side of upper. Distinct prominence can be felt in front of shoulder. False point of motion is elicited about an inch below acromion by rotating the shaft. Reduction is difficult; elbow should be carried forward and upward. In difficult cases it may be necessary to resort to direct measures. Occasionally growth of limb at this point is arrested.

Fractures of the upper end (continued).	Surgical neck.	<p>Is the part between the head and insertion of pectoralis major and latissimus dorsi. More frequent fracture at the upper end. Caused by direct violence or fall upon the hand or elbow. Line of fracture usually oblique, and lower fragment on inner side of upper. Abnormal mobility and crepitus are recognized by holding upper and rotating lower fragment. Reduction by traction and coaptation. If deformity returns obstinately, permanent extension may be necessary. Usually auto-extension will be sufficient. Fixation of arm to side of chest and shoulder cap. Hollow plastic splint on the outer side. If upper fragment is dislocated, it should be reduced by direct manipulation.</p>
Shaft.	<p>Caused by direct and indirect violence and muscular contraction. Complications consist of rupture of muscles, injury to vessels and nerves, especially musculo-spiral. Diagnosis presents no difficulties. Delayed and non-union more frequent here than any other of the long bones. Internal angular splint, shoulder cap, and a sling at the wrist. Moulded splints and plaster-of-Paris dressing also frequently used. Extension of weight may be necessary to prevent shortening.</p>	
Fractures of the lower end.	Above condyles.	<p>Varieties. — Above the condyles; above and between the condyles; either condyle; epicondyles; separation of epiphysis. Line of fracture passes through expanded lower end of humerus and may extend into joint. Directions of line of fracture. Lower fragment usually projects backward and may perforate skin. Upper fragment often injures brachial artery and median nerve. The displacement resembles backward dislocation of elbow. In differential diagnosis landmarks must be studied carefully. Reduction often very difficult. Traction must be made with elbow flexed. Limb should be immobilized by a moulded plastic posterior and anterior splints, elbow bent at a right angle. Vertical extension for two weeks may be preferable in some cases. This is especially indicated when fracture is compound. In compound fractures it may become necessary to resect fragments to effect permanent reduction.</p>

Fractures of the lower end (continued).	Intercondyloid.	<p>In addition to above fracture another line of fracture extends vertically into the first. Usually the result of direct violence.</p> <p>It may closely resemble supracondylar fracture.</p> <p>In some cases condyles are widely separated.</p> <p>Complete reduction requires the aid of anæsthesia.</p> <p>Impairment of function of joint should be expected.</p> <p>During latter part of treatment elbow should be kept in fixed position.</p> <p>Posterior moulded splint reaching from shoulder to wrist.</p> <p>Some surgeons employ extension combined with anterior splint.</p> <p>In compound fractures direct means of fixation are necessary.</p> <p>Under some circumstances lower end of humerus has been excised.</p>
	Internal epicondyle.	<p>Caused by direct violence or forced abduction of extended forearm.</p> <p>In the latter case dislocation is a frequent complication.</p> <p>Diagnosis depends on locating the detached epicondyle.</p> <p>Immobilization of joint in flexion at right angle.</p>
	External epicondyle.	<p>Very rare.</p> <p>Recognition of a small movable fragment.</p> <p>Treatment same as for internal epicondyle.</p>
	Internal condyle.	<p>Line of fracture extends from above internal epicondyle into joint.</p> <p>Fragment usually displaced upward and backward.</p> <p>External condyle unusually prominent.</p> <p>Forearm should be supported only at the wrist.</p> <p>Posterior rectangular splint after complete reduction.</p> <p>Joint should be examined after a week and existing displacements corrected.</p> <p>Fixation of limb in extended position for two weeks preferable.</p> <p>Excessive formation of callus often interferes with full motion of joint.</p> <p>Dislocation of radius backward an occasional complication.</p> <p>In this case limb should be immobilized after reduction at an obtuse angle.</p>
	External condyle.	<p>Line of fracture from a point on supinator ridge obliquely into joint.</p> <p>Displacement is ordinarily slight.</p> <p>If considerable, ulna is separated from internal condyle outward and backward.</p> <p>Immobilization in a posterior rectangular splint.</p>

Fractures of the lower end (continued).	Separation of epiphysis.	<p>Not a frequent accident.</p> <p>Lower fragment comprises epiphysis, usually comminuted.</p> <p>Symptoms and treatment same as those of supracondylar fracture.</p> <p>Treatment by full flexion is recommended by Mr. Hutchinson.</p>
After treatment of fracture just above elbow.		<p>After fracture has united and splints removed some stiffness of joint always present.</p> <p>In the majority of cases range of motion increases rapidly.</p> <p>Daily forcing of joint does more harm than good.</p> <p>Active motion, massage, and elastic traction of greatest service.</p>
Radius and ulna.	Olecranon.	<p>May be caused by contraction of triceps or direct violence.</p> <p>Line of fracture at right angles of long axis of bone in both planes, or oblique in either plane, or irregular.</p> <p>Degree of displacement.</p> <p>Localized pain, independent mobility, and crepitus; loss of function.</p> <p>If olecranon is not completely detached, immobilization of limb in a sling.</p> <p>If olecranon is detached, limb should be extended fully and immobilized, and fragment fixed by strips of adhesive plaster or elastic bandage.</p> <p>Union may be bony.</p> <p>Function of arm not much impaired, even if considerable separation takes place.</p>
	Coronoid process.	<p>Almost unknown except as a complication of dislocation backward.</p> <p>Tendency to displacement not great, as fragment is held in place by brachialis anticus.</p> <p>Fragment sometimes can be felt as a small movable body.</p> <p>Immobilization; joint flexed at right angle.</p>
	Head of radius.	<p>More frequent than has been supposed (Hofmohl).</p> <p>Mainly observed in connection with fracture of coronoid process as a complication of dislocation of elbow.</p> <p>Partial fracture, fragment being inner or anterior portion of head.</p> <p>Occasionally followed by suppuration of joint.</p> <p>Head does not move when radius is rotated.</p>

Radius and ulna
(continued).Shaft of one or both bones
of forearm.

Fracture of both bones frequent in lower and middle third.
 Radius usually broken at a higher point than the ulna.
 Cause may be direct or indirect violence.
 Partial or greenstick fracture not uncommon in children.
 Fracture of ulna usually the result of direct force.
 If it is caused by fall upon hand, head of radius is dislocated forward and upward.
 Fracture of radius alone less frequent than that of ulna.
 Displacement angular, lateral, or with overriding.
 Vicious union interferes with rotation of forearm.
 Rotatory displacement of radius liable to occur if fracture is above pronator radii teres (Callender).
 Rotation may be lost by excessive callus and ossification of interosseous ligament.
 Diagnosis of fracture of both bones easy; of either bone alone may be difficult.
 Reduction by traction with or without pressure upon projecting fragment.
 Retention by anterior and posterior splints well padded, reaching from palm.
 Forearm in sling in a position halfway between pronation and supination to elbow.

Lower end of radius (Colles's
fracture).

Most common of all fractures, especially in persons advanced in years.
 Generally produced by a fall upon the palm of the hand.
 Line of fracture usually transverse, and one-third to three-fourths of an inch above articular edge.
 In children and young adults line usually follows the epiphyseal line.
 Displacement of lower fragment backward with arrest of styloid process by crushing, and of posterior articular border by tilting or angular displacement.
 Periosteum on the back of the bone remains untorn, forming periosteal bridge.
 Penetration of the lower by the upper fragment.
 In exceptional cases styloid process of ulna is also broken off.
 Deformity characteristic, resembling a silver fork.
 Reduction sometimes very difficult; is to be effected by traction and pressure upon fragments.
 Anesthesia is required in difficult cases. If reduction is perfect, tendency to displacement is slight.

Radius and ulna (continued).	Lower end of radius (Colles's fracture) (continued).	<p>Short and anterior and posterior splints suitably padded.</p> <p>Splints should be held in place by two circular strips of adhesive plaster.</p> <p>The posterior splint should not reach farther than the wrist; anterior to palm.</p> <p>Manufactured splints should not be used.</p> <p>Retention is often secured by a circular strip of adhesive plaster and confining forearm in sling.</p> <p>Passive motion of fingers should constantly be made.</p> <p>In the young growth of bone may be arrested by the traumatism.</p>
Barton's fracture.	<p>Is fracture of posterior lip of lower end of radius.</p> <p>It is an occasional accompaniment of posterior dislocation of carpus.</p>	
Metacarpal bones.	<p>May be produced by direct or indirect application of force.</p> <p>Localized pain and tenderness, abnormal mobility, and crepitus are the symptoms to be looked for.</p> <p>Tendency to displacement slight.</p> <p>Well-padded palmar splint should maintain the concavity of the bone.</p>	
Phalanges.	<p>Are usually the result of direct violence, and are often compound.</p> <p>Fracture of proximal phalanx usually attended by angular deformity.</p> <p>Fingers should be fastened with longitudinal adhesive strips over cylindrical.</p> <p>A padded palmar splint may be employed; roller bandage.</p>	
Pelvis.	Ring of pelvis.	<p>Caused by great violence, such as passage of wheel of wagon, fall of heavy object, caving in of embankment, etc.</p> <p>It may be single, double, or multiple.</p> <p>Most frequent seat in pubic bone, line of fracture passing through upper or lower ramus.</p> <p>Separation of either symphysis is the practical equivalent of a fracture.</p> <p>Separation of pubic symphysis may result from force less than is required to produce fracture.</p> <p>Pubes is sometimes broken in two places or comminuted.</p> <p>Force transmitted through neck of femur may fracture acetabulum.</p> <p>Associated injuries are common and severe: laceration of urethra, rupture of bladder, etc.</p> <p>Displacement sometimes is well marked, rendering diagnosis easy.</p> <p>Immobilization of pelvic by girdle, combined in double vertical fracture by extension.</p> <p>In compound fracture good drainage must be secured.</p>

Pelvis (continued).	Sacrum.	{	Transverse fracture very rare, and always caused by direct violence.
		{	Frequently associated with paralysis of bladder, rectum, and lower limbs.
		{	Displacement is angular, with apex directed backward.
		{	Reduction is effected by pressing coccyx forward.
	Coccyx.	{	Very rare.
		{	Resembles in symptoms and treatment dislocation of the same bone.
	Ilium.	{	Comparatively frequent.
		{	Crest may be broken off by direct violence.
		{	Anterior superior spinous process has been broken off by direct violence and muscular action.
		{	Posterior and anterior inferior only broken off by direct violence.
	Ischium.	{	Diagnosis depends on finding detached fragment.
		{	Treatment by rest in bed.
	Pubes.	{	Rare, and always result of direct violence.
		{	Fragment either includes tuberosity or more or less of bone.
	Rim of acetabulum.	{	Not extending across both rami is rare.
		{	In exceptional cases upper half of body and adjoining horizontal ramus.
		{	Fracture may be compound and comminuted.
		{	Occurs as a complication of dislocation of hip.

Femur.	Neck.	{	More common in elderly people, owing to change of angle of neck and increased fragility of bone.
			Old classification into extra- and intracapsular fractures no longer tenable.
			Caused by misstep or fall upon great trochanter.
			Modern division into fractures at the base and small part of neck.
			In latter location line of fracture crosses neck transversely or obliquely, and is rarely impacted.
			A bridge of periosteum on anterior and inferior surface usually remains.
			Bone union is possible, but unlikely unless fragments are maintained in uninterrupted contact.
			Separation of epiphysis occasionally happens in children and young adults.
			Fractures at the base of neck are more common.
			Line of fracture at or near junction of neck with shaft.
			Fragments often impacted and great trochanter split.
			Impaction and crushing of bone; more extensive at the back than at the front.
		{	On this account limb is usually rotated outward.
		{	Bony union in such cases is the rule, and often attended by production of excessive callus.

Femur (continued).	Neck (continued).	Symptoms.	<p>Loss of function at or soon after the accident. Pain at the hip, and often in the anterior and inner part of the middle of the thigh. This symptom is increased by pressure in direction of seat of fracture. Usually eversion, occasionally inversion of foot. Pressure over front of neck shows that the tissues are less depressible. Trochanter moves with shaft of bone. Crepitus can be felt in non-impacted fractures when broken surfaces are brought in contact. Value and method of measurement. Immediate shortening varies between a fraction of an inch to two inches. Nelaton's line: line drawn from anterior superior spinous process to tuberosity of ischium. This line in a normal condition passes over upper border of great trochanter. In fractures of the neck the upper border of trochanter is forced above this line. Bryant's ilio-femoral triangle.</p>
		Diagnosis.	<p>Differential diagnosis between two varieties cannot always be made. Enlargement of trochanter indicates fracture at the base. In fracture through small part shortening as a rule is less at and some time after the injury. Age of patient, history of case, impairment or loss of function. Necessity of repeated careful examinations. In cases of doubt give patient benefit of the doubt, and treat injury as a fracture.</p>
		Treatment.	<p>Importance of general treatment. Rest in bed and Buck's extension by weight and pulley. External long splint or sand-bags to prevent eversion of limb. Immediate reduction and permanent retention by plaster cast and lateral pressure (Senn). Immediate fixation by suturing or pinning in exceptional cases. Functional result.</p>

Femur (continued).	Great trochanter.	<p>Occasionally produced by direct external violence.</p> <p>Patients are able to walk.</p> <p>Fracture always outside of the joint.</p> <p>Fragments may be large or small.</p> <p>In children entire trochanter may be detached at epiphyseal line.</p> <p>Diagnosis based on independent mobility of fragment, pain, and tenderness.</p> <p>Treatment: rest in bed and bandage.</p>	
	Shaft.	<p>Caused by direct or indirect violence or muscular contraction.</p> <p>Commonest form is the oblique fracture, often with splitting off of a lateral piece.</p> <p>Transverse fracture common in children.</p>	
		Symptoms.	<p>Angular displacement and overriding are caused by muscular contraction.</p> <p>Outer rotation of fragment by weight of foot.</p> <p>Outward rotation of upper fragment caused in like manner.</p> <p>Compound complicated fractures are frequent.</p> <p>Swelling of knee occurring soon after accident and caused by sprain.</p>
		Diagnosis.	— Pain ; loss of function ; shortening ; abnormal mobility ; crepitus ; swelling.
		Treatment.	<p>Continuous extension by Buck's method or Hodgen's splint.</p> <p>Vertical suspension in infants and young children.</p> <p>Immobilization of fragments by splints.</p>
			<p>In the adult union is complete in from six to eight weeks.</p> <p>In children the time required is from three to four weeks.</p> <p>After fracture has been partly consolidated plaster-of-Paris dressing is useful.</p> <p>Some shortening must be expected.</p>
	Lower end.	Supracondyloid.	<p>Commonly produced by indirect violence.</p> <p>Line of fracture transverse or oblique.</p> <p>Lower fragment usually displaced backward.</p> <p>Flexion of lower fragment upon tibia occasionally occurs.</p> <p>Popliteal vessels may be injured by sharp fragments.</p> <p>Diagnosis is easy.</p> <p>Treatment by plaster-of-Paris dressing or Hodgen's or Smith's splint.</p>
		Separation of epiphysis.	<p>Commonly caused by torsion or by hyperextension of leg.</p> <p>Treatment same as in preceding variety.</p>

Femur (continued).	{ Lower end (continued).	Intercondyloid.	{ Condyles separated from shaft and from each other. Caused by great violence, and often compound. Continuous extension or suspension splint. Caused by fall upon flexed knee or by lateral flexion of leg. Fragment remaining attached to tibia. Treatment by reduction and immobilization of limb.
		Either condyle.	
{ Patella.	{ Line of fracture.	Frequent between the ages of twenty and fifty years (especially in males). Usually the result of muscular contraction, but sometimes of direct violence. Fracture of both patellæ has been reported a number of times.	
		{ Almost always transverse, and generally near middle of bone. If the result of direct violence, bone is more or less comminuted. Upper fragment is drawn upward by quadriceps. If periosteum is not torn, separation of fragments is slight. As periosteum is torn some distance from fracture, it is interposed between fragments. To this occurrence has been attributed the failure to effect bony union (MacEwen).	
	{ Symptoms.	{ Loss of extension of leg. Independent lateral mobility of fragments. Usually transverse gap between fragments. Swelling of knee-joint, caused by hemorrhage into joint.	
		{ Immobilization of knee in extended position for two months, combined with dressings arranged to keep fragments in contact. If fragments are not separated, plaster-of-Paris splint. Hamilton's dressing. Agnew's splint. Malgaigne's hooks. Suturing of fragments in exceptional cases. Chromicized catgut sutures, including the soft prepatellar structures, will answer the purpose. Subcutaneous sutures are not reliable, as the principal cause of non-union remains permanently. Treatment by the usual methods, yields only a ligamentous union. Function of limb is often satisfactory, even if fragments are widely separated. If function is much impaired, arthrotomy and suturing of vivified fragments is justified. Treatment by massage (Metzger).	

Leg.	Upper end.	<p>Tibia may be broken by direct or indirect violence.</p> <p>Fibula may be broken or dislocated at the same time.</p> <p>Fracture may be transverse, oblique, comminuted or impacted.</p> <p>Fracture may extend into joint or follow epiphyseal line.</p> <p>Fractures from direct violence usually present angular deformity, apex backward; or lower fragment is displaced backward, endangering popliteal vessels.</p> <p>If fibula is not broken, displacement is slight.</p> <p>Prognosis is grave, owing to the probable occurrence of joint complications.</p> <p>Fracture through epiphyseal line may arrest growth of bone.</p> <p>Reduction, continuous extension, splints, plaster-of-Paris dressing.</p>
	Upper end of fibula.	<p>May be caused by muscular action.</p> <p>In several cases external popliteal nerve was implicated at or after injury.</p> <p>Treatment by immobilization, with knee flexed to relax biceps.</p>
	Shaft.	<p>Caused by direct or indirect violence.</p> <p>The latter cause results usually in fracture at or near junction of middle and lower thirds.</p> <p>May be transverse, oblique, V-shaped, comminuted, and frequently compound.</p> <p>When both bones are broken, fracture of tibia is commonly at a lower level.</p> <p>The common displacement is angular with overriding, the lower end of upper fragment being displaced forward.</p> <p>Fracture of tibia easily recognized.</p> <p>Fracture of fibula alone is shown by localized pain, tenderness, and sometimes by abnormal mobility.</p> <p>Reduction by traction and coaptation by lateral splints or Volkmann's splint.</p> <p>Plaster-of-Paris bandage can be used at once or after swelling has subsided.</p> <p>Angular displacement must be prevented by supporting foot properly.</p> <p>Compound fractures must be treated on strict antiseptic principles, and by direct fixation if tendency to displacement is great (Senn).</p>
	Lower end.	<p>Of these the most common is Potts' fracture, caused by forcible eversion and abduction of foot.</p> <p>This fracture rarely results from force applied in opposite direction.</p> <p>In typical cases three lines of fracture, involving both malleoli and fibula.</p> <p>If malleoli are not broken internal lateral and tibio-fibular ligament are extensively torn.</p>

Leg (continued).	Lower end (continued).	Symptoms. { Deformity characteristic, internal malleolus prominent, foot everted. Occasionally internal malleolus is forced through skin. Foot has a decided tendency to slip backward.
		Treatment. { Complete reduction of the greatest importance Anterior and posterior moulded plaster-of-Paris splints. Dupuytren's splint can also be used.
	External malleolus.	{ Caused by inward twist of foot. Line of fracture lower than in Potts' fracture. Sometimes separation of fibula from tibia is also present. More rarely tip of internal malleolus is also broken off. Rest and supporting bandage.
Bones of the foot.	Astragalus.	{ May be broken by a fall upon the foot; line of fracture through body or neck. This fracture is frequently associated with dislocation of one of the fragments. An exact diagnosis difficult or impossible, except when dislocation is present. Immobilization or removal of one or both fragments. Latter becomes obligatory when fracture is compound or when dislocated bone threatens sloughing. Functional results after removal of astragalus are good.
	Calcaneum.	{ May be broken by fall upon foot or contraction of muscles ending in tendo Achillis. In latter event treatment by immobilization; knee and ankle flexed. In fracture from fall comminution is usually present. Heel and sole are flattened. Massage and immobilization constitute the treatment in such case.
	Metatarsal bones.	{ Commonly caused by direct violence, and frequently compound. Pain, tenderness, and abnormal mobility are the most important symptoms. Treatment by rest, elevated position, and massage.

DISEASES OF MUSCLES, TENDONS, AND BURSAE.

					Trichina.
		Myositis.	Parasitic.		Echinococcus.
					Cysticercus.
Myalgia.	{	Neuralgia.	Rheumatic.		
			Syphilitic.		
			Traumatic.		
	{	Violent muscular contractions.			
Muscle-rupture.		Degeneration.—Treatment.	{ Rest injured muscle.		
			{ Relaxing compression.		
	{	Causes.			
Hernia of muscles.		Symptoms.	{ Vivifying margins of rent in fasciæ and suturing.		
		Treatment.			
	{	Etiology.	Loss of substance.		
			Paralysis of antagonistic muscles.		
			Syphilis.—Biceps of arm.		
Muscular contraction.			Myotomy.—Sterno-cleido-mastoid.		
			Brisement forcé.		
		Treatment.	Gradual extension by weight and pulley.		
			Elongation of tendon.	{ Anderson.	
				{ Keen.	
	{	Physiological.			
Hypertrophy of muscles.		Pathological.			
		Pseudohypertrophy.			
	{	Causes.	Inactivity.		
			Trophoneurotic.		
			Disease of nerve-centres.		
			Degeneration pressure.—Pigmentary; fatty; waxy.		
Atrophy of muscles.			Massage.		
		Treatment.	Active and passive motion.		
			Faradization.		

Myositis ossificans.	{ Causes. { Prolonged irritation. Syphilis. Progressive form. Treatment.—Indications for operation.
Tumors of muscles.	{ Inflammatory swellings (gumma). { Biceps of arm. Sterno-cleido-mastoid. Parasitic swellings. { Echinococcus. Cysticercus. Trichina. Rhabdo-myoma. Leio-myoma. Sarcoma.
Rupture and wounds of tendons.	{ Accidental, intentional, open, and } Tendon suture. { Without loss of substance. subcutaneous. { With loss of substance (Czerny).
Displacements of tendons.	{ Peroneal. Biceps of arm (long head). } Treatment. { Rest and fixation. Suturing of sheath. Latissimus dorsi. { Tenotomy (Wood).
Tendo-synovitis. Thecitis. Tendo-vaginitis.	{ Pathological varieties. { Plastic. Acute suppurative.—Palmar abscess. Tubercular. Circumscribed.—Ganglion. Diagnosis. { Intensity of symptoms. Location and extent of swelling. Character of inflammatory product. Acute form. { Rest, elevation of limb. Application of cold and moist heat. Free incision and drainage. Treatment. { Tubercular. { Iodoform injection. Extirpation of tendon-sheaths. Circumscribed. { Puncture. Evacuation of contents. Compression.

Paronychia.	{	Primary location.	{	Subepidermal.			
		Connective tissue.					
				Periosteum.			
				Bone.			
	{	Treatment.	{	Cold.			
				Antiseptic fomentations.			
				Free incision and drainage.			
				Removal of necrosed bone.			
				Amputation.			
Wounds of muscles.	{	Accidental.	{	Muscle-suture.			
		Operative.					
Bursitis.	{	Acute.	{	Catarrhal.	Treatment.	{	Rest.
			{	Suppurative.		{	Aspiration.
		Chronic.	{	Catarrhal.	Treatment.	{	Incision.
			{	Fibrinous.		{	Aspiration.
			{	Tubercular.		{	Iodoform injection.
			{			{	Excision.

ORTHOPEDIC SURGERY.

Torticollis.	{	Etiology.	{	Trauma; exposure to cold; nerve-irritation; congenital. Malposition of head; spinal accessory; ocular defect.
		Diagnosis.	—	Position of head; atrophy of face on affected side; unilateral.
		Treatment.	{	Retentive dressings. Open section of the resisting muscles. Muscle-suture. Resection of spinal accessory nerve in plastic form. Fixation of head during after-treatment.

Dupuytren's contraction of palmar fascia.	Etiology. { Age; occupation. Rheumatism. Reflex nervous irritation.
	Diagnosis. { Induration of palmar fascia. Absence of pain. Characteristic deformity. Chronicity of affection.
	Treatment. { Subcutaneous section of palmar fascia. Excision of indurated contracted fascia. Immobilization of the fingers in the straight position.
Club hand.	Etiology. { Congenital form. { Loss of substance by trauma or inflammation. Acquired form. { Paralysis.
	Treatment. { Prophylactic. Curative.
Syndactylism.	Etiology. — Congenital, heredity, degree and extent; also thickness of web.
	Treatment. { Simple section of web always fails. Perforation of base of fingers and subsequent section. Triangular dorsal and palmar flap; splitting of web and formation of flaps.
Polydactylism.	Congenital influence of heredity. Symmetrical affection. Point of attachment and degree of perfection of additional member. Removal of member during infancy, when remaining part of hand is perfect.
Genu valgum.	Etiology. { Overgrowth of inner condyle. Occupation, rachitis, age. Relaxation of internal lateral ligament.
	Treatment. { General orthopedic: brisement forcé; immobilization; osteoclasis; lineal transcondyloid osteotomy.
Genu varum.	Etiology. { Rachitis in children. Osteitis deformans in adults.
	Treatment. — Spontaneous recovery under appropriate general treatment; orthopedic osteoclasis.
Anterior-posterior curvatures of bones of leg.	Etiology. — Rachitis.
	Treatment. { Same as for genu valgum. Cuneiform osteotomy.

Talipes.	Etiology.	{	Congenital.	{	Heredity; uterine pressure; intra-uterine disease of central nervous system. Persistence of foetal position of foot.
	Anatomical varieties.	{	Equineous. Calcaneous. Varus. Valgus. Combinations.		
				Treatment.	{
Pes cavus.					
Pes planus.					
Hallux varus or valgus.					
Hammer toe or finger.					

SURGERY OF THE NERVES.

Anatomical remarks.	{	Location.	
		Structure.	
Wallerian degeneration.	{	Ascending or sensory.	
		Descending or motor.	
Neuritis.	{	{	Exposure to cold.
			Rheumatism.
			Syphilis.
	{	{	Infectious diseases (acute).
			Traumatic, acute, and chronic.
			Pain, remittent.
{	{	Swelling.	
		Hyperesthesia.	
		Anesthesia.	
		Paralysis.	

Neuritis (continued).	Diagnosis.	{ Character and distribution of pain. General symptoms. Rheumatism. Neuralgia.	
		Treatment.	{ Rest; galvanism; faradic current. External applications; counter-irritation. Hypodermic injections: Morphia; atropia; cocaine; chloroform. General treatment: rheumatism; syphilis. Massage. Nerve-stretching.
	Etiology.		{ General debility and anemia. Malaria and syphilis. Local irritation; renal calculi; aneurysm of aorta.
		Tic douloureux; sciatica; amputation; neuroma.	
Neuralgia.	Symptoms.	{ Pain. Absence of appreciable pathological local conditions.	
		Treatment.	{ Surgical. { Neurectomy; neurectasy or nerve-stretching. Removal of Meckel's and Gasserian ganglion. Nerve extraction (Thiersch). General. { Local application.—Galvanism. Quinine; iron; arsenic; cod-liver oil; antisyphilitic; antirheumatic.
	Neuroma.		{ Myeline. Amyeline.
Tumors of nerves.	Subcutaneous painful tubercle.		{ Neuroma of sensory nerve. Treatment — Excision.
	Sarcoma.	{ Primary starting-point.—Nerve-sheath. Tumor large, not very painful or tender. Neurectomy.—Nerve-suture. Amputation.	
		Multiple (Recklinghausen).	
	Fibroma.		

Contusion and compression.	{	Etiology.	{ Blows, bullet wounds, dislocation, fracture, tumors and aneurysm, callus, pressure from crutches, chairs.
		Symptoms.	{ Disturbance of function.
			{ Loss of function.
	{	Treatment.	{ Removal of cause.
			{ Rest.
			{ Treatment of remote results.

Incised, lacerated, and punctured wounds.	{	Etiology.	—Direct and indirect violence.			
		Symptoms.	{	General shock; pain variable.		
				Reflex paralysis. Loss of function.		{ Sensation.
						{ Motion.
				Atrophy of muscles.		
				Trophic lesions.		
		Diagnosis.	{	{ Skin dry, red, and glossy.		
				{ Nails curved, furrowed, and ridged.		
				{ Neural inflamed joints.		
		As to motions. —Dynamometer.				
As to sensations.			{ Paresthesia.			
			{ Anesthesia.			
Disturbance of function in injury or disease of fifth or trifacial, facial, pneumogastric, ulnar, musculo-spiral, and great sciatic.						

Prognosis after injuries of nerves. { Location and size of nerve.
Extent of defect.
Time of treatment.

Treatment of wounds of nerves.	{	Remote effects.	{	Electricity.—Faradization ; galvanization.
				Massage.
				Hot and cold douche.
				Injection of atropine ($\frac{1}{50}$ grain).
				Treatment of joint affection.
				Anodyne injection to subdue pain.
				Counter-irritation.

Neurectomy (continued).	{ Removal of Gasserian ganglion (Rose-Andrews); Horsley, through temporal bone.	
	Lingual nerve. —Through mouth.	
	Seventh nerve.	{ Baun's method: incision behind ear.
		{ Hüter's method: incision in front of ear.
	Spinal accessory.	{ Anterior incision.
		{ Posterior incision.
	Brachial plexus.—Horizontal incision above clavicle.	
	Median nerve. —Incision inner border of biceps.	
	Ulnar nerve. —Incision behind internal condyle.	
	Musculo-spiral. —Over groove between biceps and triceps.	
	Radial. —Incision outer border of forearm, where it passes underneath the supinator longus.	
	Great sciatic. —Middle posterior aspect of thigh, just below the gluteo-femoral crease.	
	Tibial.	{ Anterior. }
		{ Posterior. } Incision same as for ligation of arteries of the same name.

SURGERY OF JOINTS.

Anatomical remarks.

Synovitis.	{	Acute.	{	Etiology.	Pus microbes.
					Trauma.
					Foreign body in joint. {
					Loose cartilage.
					Blood.
				Symptoms.	Rheumatism.
					Pain.
					Swelling.
					Flexion of joint.
					General symptoms.
	{		{	Treatment.	Rest.
					Cold or hot applications.
					Evaporating lotions.
					Compression.
					Aspiration.
					Incision and drainage in extravasation.

Synovitis (continued).	Chronic.	Pathological conditions.	<ul style="list-style-type: none"> Synovial membrane. Contents of joint.
		Symptoms.	<ul style="list-style-type: none"> Pain and tenderness. Swelling. Atrophy of muscles.
		Diagnosis.	<ul style="list-style-type: none"> Diagnosis of general and local symptoms. Aspiration of joint.
		Treatment.	<ul style="list-style-type: none"> Rest and pressure; massage. Immobilization; electricity. Aspiration followed by compression. Intra-articular injection (3-5 per cent. solution carbolic acid).
Tubercular arthritis.	Etiological varieties.	Primary.	<ul style="list-style-type: none"> Direct invasion of osseous focus.
		Secondary to bone tuberculosis.	<ul style="list-style-type: none"> By sinus from periarticular focus.
	Pathology.	Contents of joint.	<ul style="list-style-type: none"> Hydrops. Fibrinous exudation. Tubercular pus.
		Structure of synovial membrane.	<ul style="list-style-type: none"> Villosities; granulations. Tubercular swellings.
		Cartilage.	<ul style="list-style-type: none"> Absorption. Separation.
		Bone.	<ul style="list-style-type: none"> Caries, necrosis. Caries necrotica.
		Ligaments.	
		Swelling—spindle-shaped.	
	Symptoms.	Fluctuation.	
		Condition of skin.	
	Differential diagnosis.	Pain.	<ul style="list-style-type: none"> Slight in synovial form. Severe when bone is affected.
		Rheumatism.	
		Syphilitic joint disease.	
		Gonorrhœal rheumatism.	
		Suppurative arthritis.	
		Catarrhal synovitis.	

Hip-disease, etc. (continued).	Treatment.	General. Rest. { Extension. Auto-extension—Hutchinson's shoe. Immobilization. Intra-articular and parenchymatous injections. Chiselling neck of femur in osteal variety. Incision under antiseptic precautions. Arthrectomy in synovial variety. Resection. Amputation to save life in desperate cases. Resection of acetabulum (Schmidt).
Tuberculosis of knee-joint. Gonitis. Tumor albus.	Symptoms. Prognosis same as in coxitis. Treatment.	Pain; tenderness; swelling; impairment of function. Flexion; rotation outward; dislocation of tibia backward Muscular atrophy. Abscess. Rest with immobilization with or without extension. Intra-articular injection of iodoform. Arthrectomy. Resection. { Typical. Atypical. Amputation.
Ankle-joint.	Symptoms. Treatment.	Impairment of motion. Pain and swelling. Immobilization in plaster-of-Paris bandage. Intra-articular injections. Arthrectomy. Resection. { Typical. Atypical. Osteoplastic resection (Wladimiroff-Mikulicz). Amputation.

Shoulder-joint. Caries sicca.	{	Symptoms.	{	Impairment of function (swelling absent). Atrophy of the muscles. Abscess.
		Prognosis.	—	Restriction of motion not present in hysterical affection of this joint. Usually favorable, especially in caries sicca.
		Treatment.	{	Immobilization. Treatment of abscess. Resection.
Elbow-joint.	{	Symptoms.	—	Pain; swelling; tenderness; flexion; pronation.
		Treatment.	{	Fixation in flexed position of forearm. Iodoform injections. Osteoplastic resection (olecranon intact). Excision and amputation.
Wrist-joint.	{	Intra-articular injections; rest; ignipuncture. Extend in useful position. Resection and amputation.		
Sacro-iliac joint.	—	Differential diagnosis.—Sciatica; coxitis; Potts' disease; lumbago.		
Suppurative arthritis.	{	Causes of infection.	{	Direct infections. { Trauma. Osteomyelitic focus.
				Indirect infections. { Entrance into joint of pus. Microbes floating in circulation.
				Metastatic infections. { Acute infectious diseases. Pyæmia.
		Pathological anatomy.	{	Character of joint contents.
				Textural changes in { Synovial membrane. Cartilage. Ligaments; bone.
	{	Symptoms.	General.	{ Chill. Temperature. Pulse.
			Local.	{ Pain. Swelling. Contraction of muscles. Subcutaneous œdema.

Suppurative arthritis (continued).	Treatment.	<ul style="list-style-type: none"> Aspiration and irrigation. Incision and drainage. Immobilization of joint in proper position. Arthrectomy. Atypical or typical exsection. Amputation.
Gonorrhœal arthritis.	Pathological varieties. Causes. Symptoms. Treatment.	<ul style="list-style-type: none"> Serous; seroplastic; suppurative. Gonococcus Neisser; ptomaines. Sex; extremely rare in females; occurs most frequently three to four weeks after attack. Usually appears as a monarticular affection. Swelling and discoloration of the skin; muscular atrophy. General symptoms of severe immobility of joint. Immobilization of joint in proper position. Massage and passive motion. Aspiration and irrigation with antiseptic solution (5 per cent. carbolic acid). Incision and drainage.
Rheumatic arthritis.	Symptoms. Treatment.	<ul style="list-style-type: none"> Resembling acute synovitis, usually periarticular. Suppurative; never present except in mixed affection. Rheumatic inflammations in other organs. Changes affected by chronic variety. Prophylaxis against acute exacerbations. Local treatment. <ul style="list-style-type: none"> Hot fomentations. Massage. General treatment.—Salicylates and potassium iodide.
Gouty arthritis.	<ul style="list-style-type: none"> Affects in preference small joints. Deposition of chalky concretions in joint. Acute exacerbations of chronic affections. 	

Arthritis deformans or osteo-arthritis.	{	Causes.	{	Age: middle or advanced age. Sex: more prevalent in females. Heredity; climatic influences; rheumatism. Occupation; position in life; nervous origin. Degeneration of nerve centres in medulla oblongata.
		Pathological anatomy.	{	Fibrillary changes in cartilage preceding disappearance of this structure. Sclerosed exposed bone undergoes change in shape. Synovial fringes enlarge. Fibrous degeneration of ligaments. Plastic periostitis in vicinity of joint. Effusion into part occasionally present. Changes in tendons. Deformity and ankylosis. Changes in vertebræ and finger-joints.
		Differential diagnosis.	{	Chronic rheumatism. Gout. Coxitis. Malum coxæ senile.
		Treatment.	{	Tonics. Rest is contraindicated. Massage. Douches; baths; electricity. Arsenic. Cod-liver oil. Iodides.
		Cause.	—	Locomotor ataxia.
Neuropathic arthritis.	{	Symptoms.	{	Painless arthritis. Onset sudden. Effusion into joint: destruction of joint structures. In hyperbolic variety new bone is produced. Abnormal mobility of joints from destruction of ligaments. Incomplete dislocation.
			{	Atrophy of limb.
		Treatment.	—	Protection of joint.

Hysterical joints.	{	Described first by Brodie. Knee and hip most frequently affected. Hyperesthesia of surface. Local conditions negative. Differential diagnosis.
Neuralgia of joints.	{	Causes. { Local or constitutional. Pressure upon articular nerves. Pain intermittent. No local changes. Peripheral neuritis.

WOUNDS AND INJURIES OF JOINTS.

Wounds.	Varieties.	{	Penetrating. { Open. { Incised. Punctured. Gunshot. Subcutaneous.—Fracture extending into joint.
		{	Non-penetrating. { With loss of substance. Without loss of substance. By communication through bursæ.
	Symptoms and diagnosis.	{	Nature of vulnerating body. Size of joint and extent of injury. Escape of synovia. Swelling. { Primary : hemarthron. Secondary : inflammation, effusion, and exudate.
	Treatment.	{	Examination of gunshot wounds. { Aseptic probe. Nélaton's probe. Careful primary disinfection of wound, hands, and instruments. Removal of foreign substances, including bullet when indicated. Drainage in wounds supposed to be septic. Immobilization of joint. Resection : primary and secondary. Amputation : seldom indicated as a primary operation.

Displaced semilunar cartilage.		<ul style="list-style-type: none"> Symptoms same as loose bodies in joints. Reduction of cartilage. Reduction and fixation of cartilage by incision of joint. Excision of cartilage.
Sprains.	Varieties.	<ul style="list-style-type: none"> With fracture or dislocation; without fracture or dislocation.
	Symptoms.	<ul style="list-style-type: none"> Displacements of articular ends in sprains which are complicated by fracture and dislocations. Swelling. <ul style="list-style-type: none"> Primary: effusion of blood. Secondary: inflammatory product. Pain. <ul style="list-style-type: none"> Caused by injury. Caused by inflammation. Impairment of function of joint. Ecchymosis.
	Prognosis.	<ul style="list-style-type: none"> Structure of joint. Extent of injury. Severity of subsequent reaction.
	Treatment.	<ul style="list-style-type: none"> Immobilization of joint. Hot fomentations; massage. Elastic support of joint. Aspiration of joint when much distended by blood or inflammatory product.
	Causes.	<ul style="list-style-type: none"> Blood-clot in joint; intra-articular adhesions. Partial or complete synechia of joint. Cicatricial contraction of ligaments. Periarticular adhesions. Destruction of articular surface of bone. Profuse callus in joint, fractures, or displacement of fragments.
	Varieties.	<ul style="list-style-type: none"> Fibrous.—Partial; complete. Bony.
Ankylosis.	Treatment.	<ul style="list-style-type: none"> Fibrous ankylosis. <ul style="list-style-type: none"> Prophylactic. Extension by weight and pulley. Brisement forcé. Massage. Bony ankylosis. <ul style="list-style-type: none"> Cuneiform osteotomy. Linear osteotomy. Resection.

Loose bodies in joints.	Histological varieties.	<ul style="list-style-type: none"> Fibrous. Cartilage. Bone.
	Origin.	<ul style="list-style-type: none"> Synovial membrane. Cartilage. Detached osteophytes. Fragments of cartilage or bone from trauma.
	Symptoms.	<ul style="list-style-type: none"> Weakness of joint. Swelling. Sudden pain and suspension of function.
	Diagnosis.	<ul style="list-style-type: none"> History of case. Detection and location of foreign body.
	Treatment.	<ul style="list-style-type: none"> Palliative and symptomatic. Incision of joint under strictest antiseptic precautions, and removal of body. Fixation of body with an aseptic needle prior to incision. After-treatment: immobilization.

DISLOCATIONS.

General remarks.	Definition.	(A dislocation is a permanent, abnormal, total, or partial displacement from each other of the articular portions of the bones entering into the formation of a joint.
		Incomplete, partial, or subluxation, caused more frequently by pathological conditions than trauma.
		Compound dislocation, when dislocated joint is opened by wound.
		Bilateral dislocations.
		Double dislocations.
Nomenclature.		Multiple dislocations.
	Etiological varieties.	<ul style="list-style-type: none"> Traumatic. Pathological. Congenital.
		Distal member is the one said to be dislocated.
		Name of joint or region.
		Direction of displacement of distal member.
		New relations of displaced bones, as subcoracoid dislocation of shoulder, etc.

Statistics.	{	Less frequent than fractures in the proportion of one to ten. Dislocation of shoulder most frequent; those of the elbow next. Shoulder dislocations constitute from one-half to two-thirds of all dislocations.																		
Age.	{	May occur at any age, but most frequent between the ages of twenty and thirty. Relative frequency greatest between forty and seventy years. Below twenty years shoulder dislocation rare. dislocation of elbow frequent; the reverse is the case later.																		
Etiology and mechanism.	{	<table> <tr> <td>Predisposing causes.</td><td>{</td><td> <table> <tr> <td>Anatomical.</td><td>{</td><td>Conformation of joints. Deviation of axis of distal member (elbow-joint).</td></tr> <tr> <td>Pathological.</td><td>{</td><td>Distension of joint by effusion. Destruction or softening of ligaments. Fracture involving joint or its vicinity.</td></tr> </table> </td></tr> <tr> <td>Immediate or determining causes.</td><td>{</td><td> <table> <tr> <td>External violence.</td><td>{</td><td>Direct. Indirect.</td></tr> <tr> <td>Muscular action.</td><td></td><td></td></tr> </table> </td></tr> </table>	Predisposing causes.	{	<table> <tr> <td>Anatomical.</td><td>{</td><td>Conformation of joints. Deviation of axis of distal member (elbow-joint).</td></tr> <tr> <td>Pathological.</td><td>{</td><td>Distension of joint by effusion. Destruction or softening of ligaments. Fracture involving joint or its vicinity.</td></tr> </table>	Anatomical.	{	Conformation of joints. Deviation of axis of distal member (elbow-joint).	Pathological.	{	Distension of joint by effusion. Destruction or softening of ligaments. Fracture involving joint or its vicinity.	Immediate or determining causes.	{	<table> <tr> <td>External violence.</td><td>{</td><td>Direct. Indirect.</td></tr> <tr> <td>Muscular action.</td><td></td><td></td></tr> </table>	External violence.	{	Direct. Indirect.	Muscular action.		
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Pathology of recent dislocation.	{	Laceration of ligaments. { In bone and socket-joint outside of dislocation. In other joints on either or both sides ligaments are torn. In dislocations of lower jaw ligaments are stretched and torn. Same may be the case in joints supplied with relaxed ligaments.																		
	{	Rupture of muscles.																		
	{	Fracture of bony prominences.																		
	{	Complications. { Fracture of shaft of dislocated bone. Splitting of dislocated end. Rupture of vessels and nerves. Fracture of articular end of dislocated bone is rare. Partial fracture of rim of socket or avulsion of an epiphysis.																		
	{	Reduction as a rule is followed by repair of the torn capsule and ligaments. Complete reduction frequently fails to take place.																		
	{	Unreduced dislocations. { Encapsulation of dislocated end in abnormal position. Union of untorn portion of capsule with cavity of joint. Formation of new socket. Adhesion of neighboring socket and nerves to dislocated bone. Filling up of socket with new tissue.																		

Pathology of recent dislocation (continued).	Symptoms.	Deformity.	<ul style="list-style-type: none"> Frequently so marked as to be almost diagnostic. Recognized presence of head of bone in an abnormal position. Axis of dislocated bone.
		Measurements.	<ul style="list-style-type: none"> Limbs should be placed in symmetrical position. With few exceptions shortening is always found.
		Attitude of limb.	
		Restriction of normal range of motion in certain directions.	<p>This is due to new relations of head of dislocated bone and untorn portion of ligament.</p> <p>Pain if severe and persistent indicates that some of the soft parts are kept forcibly stretched.</p>
		<p>Reduction should be effected as soon as possible.</p> <p>Great shock and inflammatory reaction may render postponement necessary.</p> <p>Method of reduction depends upon the recognition of the obstacles to reduction.</p>	
		Obstacles to reduction.	<ul style="list-style-type: none"> Muscular contraction. Untorn portions of capsule and ligaments. Interposition of a portion of capsule. Unusual relation to certain adjoining muscles. In typical dislocations untorn portions of capsule should be relaxed. In atypical dislocations ligaments offer no resistance.
	Treatment.	Reduction by manipulation.	<ul style="list-style-type: none"> This consists of a succession of gentle motions communicated to the dislocated limb, by which the sides of the rent in either capsule are separated from each other, and the head of the bone is rolled back into place by the aid of the untorn ligaments. Applicable only to typical dislocations. Kocher's method of reducing subcoracoid dislocations of the shoulder. Bigelow's method of reduction of dorsal dislocations of hip. Muscular contraction can be overcome by anesthesia. Ether should be given until patient is thoroughly under its influence. Use of pulleys only in exceptional cases, and then with great care. Gradual traction by weight and pulley or by India rubber. Diversion of patient's attention. Interposition of soft parts necessitates operative interference.

Pathology of recent dislocation (continued).	Treatment (continued).	Old dislocations.	{	Manipulation after adhesions have been ruptured.
				Strong traction.
				Extensive additional lacerations are usually produced.
				Reduction by cutting down upon head of dislocated bone.
				Restoration of function after reduction often very imperfect.
	Accidents.		{	Tearing of skin by excessive and improperly applied traction.
				Fracture of bone owing to exceptional fragility.
				Rupture of vessels: subscapular or circumflex in anterior dislocation of shoulder.
				Rupture of axillary: of 47 cases 31 died (Stimson).
				Injuries to main nerves—roots of brachial plexus have been torn out.
	After-treatment.		{	Syncope or sudden death—rupture of vessels or fat embolism.
				Immobilization of limb for a few days.
				Avoidance for a few days of attitudes which would favor recurrence.
	Habitual dislocation.	—		Not amenable to successful treatment, except by operation.
		{	Usually only recognized after some months or years.	
			Caused by faulty development of joint, paralysis, etc.	
		{	Hip.	Most frequent; about 90 per cent. of all.
				More common in females than males.
				One or both joints may be involved.
				Imperfect development of acetabulum.
				Usually head of femur is smaller than usual and the neck short.
				Shortening increases when child commences to walk.
				Upper part of pelvis is tilted forward and lumbar spine is curved forward.
				Continuous extension prolonged for several months.
				In unilateral cases abduction and fixation of limb.
				Hoffa's operation.
				Injections around head of bone of 10 per cent. chloride zinc (Lannelongue).
			Knee. — In most frequent form leg is in extreme upper-extension.	
		{	Spontaneous dislocations.	Accident occurs without external violence.
				Defective ligaments or joint surfaces the predisposing causes.
				Hydrops of joints a frequent cause of relaxation of ligaments.
				Paralytic or myopathic dislocations are most common at the shoulder.

SPECIAL DISLOCATIONS.

- Lower jaw. {
- Constitute about 4 per cent. of all dislocations.
 - More frequent in women than in men.
 - May be unilateral or bilateral.
 - Displacement forward; the condyle rests in front of the eminentia articularis.
 - Dislocations backward are very exceptional.
 - Usual cause of forward dislocation is the wide opening of the mouth.
 - Backward dislocations are caused by blow upon chin.
 - The symptoms present are: inability to close mouth, projection of jaw, and presence of condyle in front of its normal position.
 - Deviation of jaw is present in unilateral dislocation.
 - Reduction is effected by forcible pressure with the thumb downward and backward upon the lower molar teeth.
 - Operative treatment of recurring dislocation.
- Sternum. {
- Dislocation of one of the normal segments from one another is a rare injury.
 - If present, it cannot always be differentiated from a fracture.
 - Dislocation of the body from the manubrium may be in a forward or backward direction.
 - Caused by direct and indirect violence in anterior dislocations.
 - It may be complete or incomplete.
 - In complete variety lower fragment may override the upper as much as an inch.
 - Costal cartilages retain their attachments to the manubrium.
 - Backward dislocations are caused only by direct violence.
 - Either form is associated frequently with dislocation or fracture of the ribs or of the costal cartilages.
 - Interference with respiration and circulation may be very severe.
 - Diagnosis must rest on careful examination of displaced parts and their vicinity.
 - Gravity of injury appears to depend mainly on associated lesions.
 - Reduction by forcible flexion of trunk and direct pressure on the projecting fragments.
 - Non-reduced dislocations have not caused any serious disturbance.
 - Dislocation of ensiform cartilage is very rare.
 - Apex may be directed forward or backward.
 - Persistent vomiting has been a pronounced symptom in some cases.
 - Reduction by drawing apex forward with the fingers or sharp hook, followed by cessation of vomiting.

Ribs and costal cartilages.	<p>Nine cases of dislocation of the head of the rib have been recorded. Injury caused by a blow upon the rib from behind. Chondro-costal dislocation quite rare; only six cases have been reported. Caused by direct violence and prolonged or violent coughing. Treatment same as that for fracture of the rib or cartilage. Chondro-sternal and chondro-chondral dislocations are very rare. Caused by external violence and muscular action. Both forward and backward displacements have been observed. Reduction easy; tendency to re-dislocation great.</p>		
Clavicle.	Sternal end.	Forward.	<p>Most frequently caused by forcible movement of shoulder downward and backward. Habitual dislocation in this direction. Dislocation may be complete or incomplete. Occasionally a piece is broken off from end of clavicle or from sternum. Projection; abnormal position of end of clavicle; shrinking of shoulder and loss of function. Reduction by drawing shoulder backward and direct pressure. Prolonged rest in bed or figure-of-8 bandage in after-treatment. Moulded splints to end of clavicle also useful. Liability to recurrence overcome by parenchymatous injection of alcohol.</p>
		Backward.	<p>Caused by direct violence or by forcing shoulder forward and inward. May be complete or incomplete. In former variety end of bone presses upon trachea and œsophagus. Diagnosis rests on finding end of bone in abnormal location and hanging of shoulder forward and inward. Reduction is effected by drawing shoulder outward and backward. In this position it should be immobilized to prevent redislocation.</p>
		Upward.	<p>Has been caused by forcible depression of shoulder. Stokes reports a double dislocation of this kind by action of sterno-mastoids. End of bone is displayed inward as well as upward. Reduction is made by drawing shoulder outward and by direct pressure. Malgaigne's hooks have been used to prevent recurrence.</p>

Clavicle (continued).	{ Acromial end.	<p>Common dislocation is upward, or upward and inward. Fracture of edge of either bone may accompany the dislocation. The cause is usually a blow or fall upon the shoulder. Reduction is readily accomplished by direct pressure and elevation of arm. Displacement recurs as soon as pressure is removed. Unreduced dislocations cause no loss of function. Stimson's method of securing retention by adhesive strips, including clavicle and elbow. A few cases of subacromial dislocation have been reported. Two cases of subcoracoid dislocation have also been recorded. About a dozen cases of simultaneous dislocation of both ends are on record.</p>
Shoulder.		
Varieties.		<p>These are as frequent as all other dislocations taken together. They are rare in youth and old age, and more frequent in men than in women.</p> <p>Anterior. —Subcoracoid, very common; intracoracoid, exceptional; subclavicular. Downward. —Subglenoid, uncommon; erecta, very rare; subtricipital (?). Posterior. —Subacromial, rare; subspinous, very rare. Upward. —Supraglenoid, very rare.</p>
Anterior.		<p>Subcoracoid.</p> <p>This is the commencement form of dislocation of the shoulder. Head of humerus is beneath or in contact with coracoid process. Accident is caused by direct violence, fall upon hand or elbow, forcible abduction or rotation outward of limb or muscular action. Capsule is torn at its inner and lower portion. In exceptional cases capsule is not torn. Untorn portion of subscapular muscle may be interposed. Supra-and infra-spinatus and teres minor may be also torn. A portion of greater tuberosity may be detached. Long head of biceps is occasionally ruptured.</p> <p>Symptoms.</p> <p>Elbow hangs a little away from the side. Depression beneath acromion process. Abnormal location of head of humerus. Faulty axis of humerus. Shortening of abducted limb. Search for complications.</p>

Shoulder (continued).	Anterior (continued).	Intracoracoid.	<ul style="list-style-type: none"> Head of the humerus is displaced farther inward. Subscapularis is widely torn. Rent in the capsule is large. Elbow more widely abducted; deltoid more flattened. Occasionally arm is fixed in complete horizontal abduction.
	Treatment.	<ul style="list-style-type: none"> Reduction usually easy; occasionally impossible, except by operation. Kocher's method most successful, and may be employed with and without anesthesia. Stages of manipulation. <ul style="list-style-type: none"> Outward rotation, elbow flexed; elevation of elbow; inward rotation and lowering of elbow. Traction outward. Reduction by taking the patient unawares (Cole). In intracoracoid dislocation traction outward should be made. 	
	Downward.	<ul style="list-style-type: none"> Caused by forcible abduction of arm; capsule is torn at its lower part. Lower part of the traction of the subscapularis may be torn. Greater tuberosity usually broken off. Symptoms similar to those of subcoracoid dislocation, but more marked. Head of humerus can be readily felt in the axilla. Outward traction aided by anesthesia and direct pressure. In luxatio erecta arm is held vertically. Traction in this position readily effects reduction. Only one case of subtricipital dislocation has been reported. The subacromial variety most frequent form. Caused by pressure of the head of the humerus outward and backward. Capsule is torn on its outer side and above and below. [sometimes torn. The lesser tuberosity is sometimes broken off and supraspinatus, teres minor, triceps In subacromial variety head of humerus is below projecting and acromion process. In subspinous variety the head is displaced further backward. 	
	Posterior.	<ul style="list-style-type: none"> Arm hangs by the side in inward rotation with elbow directed forward. Swelling is behind the shoulder joint. Coracoid and anterior part of acromion preternaturally prominent. Passive motion restricted and painful. Reduction in recent and old cases easy by traction forward upon arm or by direct pressure. Recurrence is frequent owing to injury of subscapularis. Unreduced dislocations greatly impair usefulness of arm. 	

Shoulder (continued).	Upward.	<p>The possibility of the occurrence has been proved by a few cases and two autopsies. Among the causes mentioned are fall upon elbow, blow downward upon acromion, and convulsions.</p> <p>In one or two cases coracoid process was broken at the same time.</p> <p>Head of humerus lies between acromion and coracoid, in front of clavicle.</p> <p>Arm hangs by the side, elbow directed backward.</p> <p>Active and passive movements are greatly restricted.</p> <p>Reduction by traction and elevation of elbow.</p> <p>Tendency to recurrence is great.</p> <p>In three old cases reduction failed.</p>
	Compound dislocations.	<p>Very rare, and usually caused by extreme violence.</p> <p>Wound is commonly in the axilla.</p> <p>The gravity of this injury arises from injury done to vessels and other soft tissues and probability of suppuration.</p> <p>Treatment should be very thoroughly antiseptic.</p> <p>Drainage should always be established by packing wound with iodoform gauze.</p> <p>Excision of head of humerus may become necessary to favor drainage and oppose ankylosis.</p>
Complications of dislocation of shoulder.	Fractures.	<p>May involve any of the bony prominences of humerus or scapula or upper end of humerus.</p> <p>Greater tuberosity of humerus is frequently the seat of a traction fracture.</p> <p>The fragment may lodge in glenoid fossa and constitute a serious obstacle to reduction.</p> <p>Lesser tuberosity is broken off by traction only in backward dislocation.</p> <p>Acromion is sometimes broken by direct violence.</p> <p>Coracoid process is rarely broken.</p> <p>Glenoid fossa is probably often broken at its edge.</p> <p>Fragment may interfere seriously with maintenance of humerus in its socket.</p> <p>Fracture of anatomical or surgical neck of humerus.</p> <p>The former is a much rarer complication than the latter.</p> <p>It is caused after dislocation by impact against anterior edge of glenoid fossa.</p> <p>Diagnosis is difficult; head must be found in its abnormal position.</p> <p>Fracture of surgical neck is recognized with less difficulty.</p> <p>Greater tuberosity and head do not move with shaft of humerus.</p> <p>Reduction of upper dislocated fragment is to be accomplished by direct pressure.</p> <p>If this fails, it may be advisable to resect upper fragment.</p>

Complications of dislocation of shoulder (continued).	Injuries to blood-vessels and nerves.	<p>Axillary artery or one of its branches, especially subscapular, may be ruptured. This accident has usually occurred during attempts at reduction. Hematoma in axilla; radial pulse present if a branch is injured. The extravasated blood still further impairs the circulation. Treatment: pressure, ligature of subclavian or axillary, amputation. Posterior branch of circumflex nerve is frequently torn or overstretched. Paralysis of deltoid may remain permanently. Unreduced dislocations often permit fair use of arm.</p>
	Treatment of old unreduced dislocations.	<p>If head of bone presses on nerves or vessels, operation is indicated. If reduction is impossible after separation of adhesions, it may become necessary to make an arthrotomy to assist reduction, or excise the head of the humerus. Intentional fracture of surgical neck has been done to improve position of arm or to create a new joint.</p>
Elbow.	Both bones backward.	<p>These are second in order of frequency, and are much more common in young persons. Both bones of the forearm may be dislocated in all four directions, or either may be dislocated alone.</p>
		<p>Is the most common form of dislocation at the elbow.</p> <p>Causes. Usually fall upon outstretched hand, elbow in hyperextension or forearm abducted. Internal and external lateral ligament and capsule in front are torn. Internal epicondyle is sometimes broken off. Coronoid process occasionally is broken, as well as a portion of the head of the radius. These accidents are only caused when dislocation is produced by great violence while the joint is in partial flexion.</p>
		<p>Symptoms. The elbow is partly flexed. Disturbance of relations between anatomical landmarks. Tip of olecranon process and head of radius are found displaced backward. Passive flexion and extension within narrow range. In full extension lateral mobility can be recognized. If swelling is not too great, tendon of triceps is prominent, and can be felt. Trochlear prominence of humerus can sometimes be felt in the flexure of the elbow.</p>
		<p>Treatment. In recent cases reduction is generally very easy. Under anesthesia reduction can be accomplished by pressure. Traction and pressure most effective. Flexion over knee has often proved successful. In old dislocations adhesions must first be ruptured.</p>

Both bones backward (continued).	Compound dislocations.	{ Strict antiseptic precautions must be observed to prevent suppuration. If suppuration sets in, ample drainage must be established. If this does not succeed, resection may become necessary.
	After-treatment.	{ Immobilization of limb in flexed position for three weeks. Passive and active motion, hot and cold douches and massage later. Limitation of motion may remain as a permanent result.
Elbow (continued).	Lateral.	{ Dislocation to either side of both bones may be complete or incomplete. Coronoid process generally remains anterior to humerus. Incomplete dislocation to inner side quite frequent, and often not recognized. Usually caused by a fall upon outstretched hand. Arm is strongly abducted and internal lateral ligament torn.
		{ Sigmoid cavity lies below, and embraces internal epicondyle. Radius lies in front of and somewhat below trochlea. Both lateral ligaments are torn. Forearm pronated and slightly flexed. Olecranon and external condyle are prominent. Head of radius is felt below and to inner side of its normal position. Flexion and extension easy and not very painful. Reduction is made by traction upon the extended forearm, and direct lateral pressure at the elbow. Function of limb in unreduced dislocation not much impaired.
		{ Lateral displacement so far that central longitudinal ridge of sigmoid cavity has passed beyond the outer rim of trochlea. Radius lies partly below or entirely beyond the external condyle. Elbow more or less flexed and forearm pronated. Internal condyle prominent, skin tightly stretched over it. External condyle marked. Olecranon prominent and tendon of triceps curved. Head of radius can be felt. Reduction by traction or by hyperextension combined with direct pressure. Broken epitrochlea in groove of trochlea may seriously oppose reduction.

Elbow (continued).	Lateral (continued).	Complete outward.	<p>Three varieties, according to extent of displacement.</p> <p>In extreme cases bones of forearm override outer border of humerus.</p> <p>Caused by fall upon hand or elbow or blow upon upper and inner side of forearm.</p> <p>Elbow may be extended or flexed.</p> <p>Study of anatomical landmarks.</p> <p>Reduction easy, owing to the extensive laceration of ligaments.</p> <p>Limb often useful in unreduced dislocations.</p>
	Forward.		<p>Only twenty cases of this rare dislocation have been reported.</p> <p>In seven of these dislocation was compound, and in six of these olecranon was fractured.</p> <p>In most cases injury was caused by direct violence upon back of flexed elbow.</p> <p>Fractured olecranon remains in place; ulna and radius are displaced upward and forward.</p> <p>If olecranon is not fractured, it either rests against under surface of humerus or on its anterior surface.</p> <p>In the latter variety triceps is detached from the olecranon.</p> <p>Reduction is easily effected.</p> <p>If dislocation is compound, strict antiseptic precautions must be carried out and joint immobilized for at least three weeks in flexion.</p>
	Divergent dislocation of the radius and ulna.	Varieties.	<p>Antero-posterior (11 cases).</p> <p>Transverse (1 case).</p> <p>In first variety ulna is behind and radius in front of humerus.</p> <p>In the transverse form olecranon lays behind epitrochlea and radius, on the outer surface of external condyle.</p> <p>Most frequent forcible abduction of forearm.</p> <p>In two cases reduction failed, and in one only ulna could be replaced.</p>
	Ulna alone.		<p>Dislocation of this bone alone is exceedingly rare.</p> <p>Backward and outward displacement has been produced by inward rotation of the forearm, followed by abduction.</p> <p>Abduction in hyperextension lacerates internal lateral ligament when bone is displaced by pronation and abduction.</p> <p>Forearm is usually in full extension and adducted.</p> <p>Flexion is very painful; rotation free.</p> <p>Trochlea is prominent in front, olecranon behind.</p> <p>Head of radius is in place.</p>

Elbow (continued).	Radius alone.	Backward.	<p>Caused by abduction of forearm and by aid of an associated fracture of ulna, or rupture of interosseous ligament.</p> <p>Orbicular and external lateral ligaments have been found ruptured.</p> <p>Reduction by direct pressure usually successful.</p> <p>Failure to reduce dislocation is owing to interposition of orbicular ligament.</p> <p>Very rare.</p>
		Outward.	<p>In some of them inner portion of head of radius had been broken off.</p> <p>Head of radius can be readily detected in its abnormal position.</p> <p>Reduction by abduction of forearm and direct pressure.</p> <p>More common than preceding forms.</p> <p>Frequently accompanied by fracture of shaft of ulna by fall upon head.</p> <p>Head of radius is displaced forward and upward.</p> <p>Orbicular and outer portion of anterior ligament are torn.</p> <p>Abduction, flexion, and extension not much impaired.</p>
		Forward.	<p>Supination is limited.</p> <p>Head of radius can be felt in the fold of the elbow.</p> <p>Reduction sometimes easy, sometimes impossible.</p> <p>Direct pressure with forearm in abducted position.</p> <p>In fracture of shaft of ulna this dislocation should be looked for.</p>
		Downward.	<p>Displacement of head downward below lower border of orbicular ligament (Duverney, 1751).</p> <p>Occurs usually in children less than three years of age.</p> <p>Caused by traction upon the hand.</p> <p>Tenderness in region of head of radius.</p> <p>Space between head of radius and external condyle of humerus.</p> <p>Passive motion free except supination.</p> <p>Reduction by forcible supination attended by a slight click.</p>
	Old unreduced dislocations.		<p>Early and firm adhesions and production of new bone soon transform recent into old irreducible dislocations.</p> <p>If limb is extended and stiff, forcible flexion or arthrotomy should be done.</p> <p>Incisions should be lateral and posterior transverse.</p> <p>Triceps tendon should be divided at its attachment, and joint freely opened from behind.</p>

Wrist.	Lower radio-ulnar joint.	<p>The ulna is spoken of as the dislocated bone.</p> <p>Dislocation backward is caused by exaggerated pronation.</p> <p>End of bone forms a marked prominence on the back of the wrist.</p> <p>Reduction by direct pressure.</p> <p>Dislocation forward is caused by direct violence.</p> <p>Ulna projects anteriorly, and sometimes overlaps the radius.</p> <p>Reduction by direct pressure.</p>
	Carpus from radius.	<p>May take place backward, forward, and, in exceptional cases, outward.</p> <p>It may be complete or incomplete.</p> <p>It may be attended by fracture of anterior or posterior lip of radius.</p> <p>Caused either by forcible flexion, extension of wrist, or direct violence.</p> <p>In incomplete form cuneiform bone is not displaced, while scaphoid and semilunar are displaced from radius.</p> <p>Differential diagnosis between this accident and Colles's fracture.</p> <p>In forward dislocation carpal bones form a rounded prominence on front of wrist.</p> <p>Reduction is easy by traction and direct pressure.</p> <p>Spontaneous luxation forward has been described by Madelung.</p> <p>It occurs gradually in young persons, and is caused by absorption or arrest of growth of anterior portion of articular surface of radius.</p> <p>End of ulna projects, dorsal flexion diminished, and antero-posterior diameter of wrist increased.</p>
	Carpal bones.	<p>Very few cases of backward or forward dislocation of second row have been described.</p> <p>With the exception of the cuneiform, all of the carpal bones have been found separately dislocated.</p> <p>Semilunar is most frequently dislocated in half of the cases of dislocation.</p> <p>Reduction by extension, flexion, and direct pressure.</p>
	Carpo-metacarpal.	<p>Metacarpal bone of thumb most frequently dislocated.</p> <p>Displacement is usually backward and incomplete.</p> <p>Caused by forcible flexion or direct violence.</p> <p>Base of bone can be seen and felt between tendons of extensor primi and secundi internodii.</p> <p>Reduction usually easy by direct pressure.</p> <p>Recurrence must be prevented by immobilization for one or two weeks.</p>

Thumb and fingers.	Backward.	<p>Dislocation of the metacarpo-phalangeal joint of thumb is quite common. This dislocation presents three forms: incomplete, complete, and complex. First form can be voluntarily produced by many persons. Reduction is accomplished by action of the flexors. In complete form the phalanx is carried backward and upward on dorsum of metacarpal. It is produced usually by forced extension. Anterior ligament is torn away from metacarpal bone and drawn backward with its sesamoid bones. The tendon of the long flexor slips to one side of the head, usually the inner. The first phalanx is in extension at a right angle, terminal phalanx in flexion. Head of metacarpal is prominent in the thenar eminence. In complex form the glenoid ligament is turned upward so as to lie between the bones. The thumb is in straight extension, parallel and posterior to the metacarpal. In effecting reduction complete should not be transformed into complex form. Extension should be maintained or increased, and ball of thumb pushed forward until it can be turned into place by flexion. If this fails, rotation should be tried. In complex form more force is required. If manipulation fails, arthrotomy becomes necessary.</p>
	Forward.	<p>Usually caused by forced flexion. Head of metacarpal bone can be felt on the dorsum and in front of phalanx. Reduction by direct pressure, aided if necessary by traction and flexion.</p>
	Metacarpo-phalangeal dislocation of the fingers.	<p>These joints have a glenoid ligament, and sometimes a sesamoid bone. Same difficulty in reduction as in backward dislocation of thumb. Reduction the same as in the latter class of cases.</p>
	Dislocations of the phalanges.	<p>Direction may be forward, backward, or lateral. Reduction is usually easy. In difficult cases the thick anterior ligament is interposed.</p>

Pelvis and coccyx.	{	Pelvis.	{	Pubic symphysis. Sacro iliac symphysis. Usually associated with fracture.			
		Coccyx.	{	A rare injury. More common in women than in men. Pain, tenderness, disability, and nervous disturbances. Forward dislocations by violence upon the region of the coccyx. Pain severe, and radiates through trunk and limbs. Examination through rectum. Tendency to recurrence great. Excision of coccyx may become necessary.			
Hip.	{	Form from 2 to 10 per cent. of all dislocations. More frequently met with in men than women. May occur at all ages, though most frequent in persons from twenty to fifty years of age. Description of Y-ligaments and its influence in determining typical dislocation (Bigelow). Compound dislocations are very rare. Dorsal or backward dislocation the most frequent form.					
		Varieties.	{	Backward.	{	Dorsal, comprising the "iliac" and the "ischiatric," or those upon the dorsum ilii and into ischiatic notch of older writers. Anterior oblique.	
				Downward and inward.	{	Everted dorsal, comprising the "supraspinous" and some of the "supracotyloid." Obturator. Perineal.	
			{	Forward and upward.	{	Suprapubic. {	Ilio-pectineal. Pubic. Intrapelvic.
				Upward.		—	Supracotyloid or subspinous.
			Downward.	—	On the tuberosity of the ischium.		
			Backward.	{	Usual location of head of femur above and behind the posterior lip of acetabulum. Limb flexed, adducted, and rotated inward in same position as when dislocation occurred. Head of femur may become displaced later forward and inward, representing everted variety. As a further variety of this dislocation, Bigelow has described the "anterior oblique."		

Hip (continued).	Backward (continued).	Dorsal.	<p>By far the most common form.</p> <p>Head of femur escapes through rent of capsule posteriorly, and rests close to margin of acetabulum.</p> <p>Indirect external violence through axis of femur; thigh flexed and rotated inward and adducted.</p> <p>In typical cases the Y-ligament is not torn.</p> <p>Quadratus femoris and gemelli usually ruptured.</p> <p>Rent in capsule is usually much lower than position of head.</p> <p>The edge of the acetabulum may be chipped off or extensively broken.</p> <p>Symptoms are characteristic.</p> <p>Limb adducted, rotated inward, and more or less flexed.</p> <p>Knee rests upon the front of opposite thigh; patient in recumbent position.</p> <p>Trochanter above Roser-Nélaton's line.</p> <p>Function of limb is lost, and only passive flexion and adduction are possible.</p> <p>Limb is shortened.</p>
		Everted dorsal.	<p>Exceptional variety of dorsal dislocation.</p> <p>Outer portion of Y-ligament is torn.</p> <p>If head of femur has been displaced to and above anterior-inferior spine of ilium, limb is everted, extended, and slightly abducted.</p>
		Anterior oblique.	<p>Extremely rare, only one case recorded.</p> <p>Limb crosses opposite thigh, extended and everted.</p>
		Treatment.	<p>Most important point is to relax untorn portion of capsule and Y-ligament.</p> <p>Head of bone should then be brought opposite rent in capsule, and lifted into place by traction or manipulation, or by abduction and outward rotation.</p> <p>Position of patient and description of manipulation.</p> <p>Reduction with patient in ventral recumbent position, legs hanging down from margin of table.</p> <p>Traction in direction of axis of dislocated bone.</p> <p>Everted dorsal and anterior oblique should first be converted into dorsal form, and then reduced as such.</p>

Hip (continued).	Downward and inward.	Obturator.	Head of femur escapes at lower and inner part of the socket.
			Head of bone is found either in obturator foramen, or passes further inward to perineum (perineal dislocation).
			The limb is flexed, abducted, and rotated outward.
			Commonly caused by violence upon back of pelvis, thigh flexed and abducted. It may be produced by forced abduction alone. Untorn Y-ligament holds limb in abduction and flexion. Limb appears longer, and in standing position is held forward. Comparative measurement shows shortening. Trochanteric region is flattened, the adductors tense. Some patients have continued to walk after the accident. Reduction is made by flexion of hip to a right angle, traction, adduction, and rotation inward. Further outward rotation instead of inward in the last step may also succeed.
		Perineal.	Flexion and abduction much more marked than in preceding form. Shortening, half an inch or more. Caused by forcible extreme abduction, laceration of soft parts, extension. Reduction under anesthesia by flexion, traction, adduction, and lowering of limb (Stimson).
			Head of femur upon upper ramus of pubes at ilio-pectineal line or further inward near symphysis. Psoas and iliacus muscles stretched across the neck, and femoral vessels are usually raised by the head.
	Upward and forward and inward and forward (supra pubic).		Ilio-pectineal is the most common form. Limb markedly everted and slightly abducted. Head of femur can be felt in the groin. Outer and posterior aspects of hip flattened. Reduction by traction in axis of limb until head reaches pubic ramus, then flexion and direct pressure on head, and finally rotation inward.
			Only a few cases of this form have been reported. Head of femur below and a little to outside of anterior inferior spine of ilium. Limb everted and sometimes abducted. Trochanter displaced upward and backward. [they sought treatment. Some patients have been able to walk with a limp for several days before
	Upward (supracotyloid).		

Hip (continued).	Downward upon tuberosity of the ischium.	<p>Exceedingly rare. Often converted into a dorsal or obturator variety. Limb sharply flexed, and may be somewhat abducted and everted. Reduction easy by traction in flexion.</p>
	Complications of dislocation of the hip.	<p>Very rarely compound; if so, usually fatal. Injury of femoral vessels has occurred only in suprapubic and obturator dislocations. Fracture of neck of femur has occurred during attempts at reduction. This accident renders reduction impossible. Necrosis of head is likely to follow, if fracture is through narrow part of neck. In young persons excision of head may be advisable.</p>
	Treatment of unreduced dislocations.	<p>Arthrotomy has seldom proved successful. Two successful cases were reported by the late Dr. Parkes. Excision of head and subtrochanteric osteotomy have yielded good results. A fairly useful limb will ultimately result in many cases without reduction.</p>
	Pathological dislocations.	<p>Causes. <ul style="list-style-type: none"> Rachitis. Muscular paralysis. Articular inflammations in the course of various specific fevers. Tuberculosis. Prolonged maintenance of limb in flexion and adduction. </p> <p>It may occur gradually and painlessly. Owing to nature of primary cause, reduction and retention not successful.</p>
	Dislocations of this joint are rare.	
Knee.	Varieties.	<ul style="list-style-type: none"> Forward. Backward. Outward. Inward. By rotation.
	Often compound, and complicated by injury of popliteal vessels and nerves.	
	Forward.	<p>May be complete, or, more commonly, incomplete. Caused by hyperextension or direct violence. In complete form tibia lies in front of condyles. In incomplete form laceration less and displacement of articular surfaces only partial. In compound dislocation wound in skin is posterior and transverse. Reduction easily made by traction and direct pressure.</p>

Knee (continued).	Backward.	{	May be complete or incomplete.	
			Most frequently caused by violence received upon front of leg or back of thigh.	
			Patella sometimes dislocated outward.	
			Leg in full extension or hyperextension, and sometimes deviated to one side.	
	Lateral.	{	Reduction is easy by traction and direct pressure.	
			Much less frequent than either of above forms.	
			Outward; more rarely inward; complete or incomplete.	
			Common cause of incomplete form, forced abduction or adduction.	
	Dislocation by rotation.	{	Patella usually deviated toward side of dislocation.	
			Reduction by traction and pressure.	
Immobilization of limb for several weeks.				
Dislocation is termed outward or inward according to direction in which toes are turned.				
Semilunar cartilages.	{	Dislocation is complete if condylar surfaces are displaced—one forward, the other backward.		
		Rare injury; outward form more frequent.		
		Reduction easily effected by rotating leg in opposite direction.		
		Dislocation may occur of either cartilage at either end or periphery.		
		Displacement may be toward the intercondyloid notch or to the outside.		
		Injury complicated often by dislocation or sprain.		
		Produced by rotation of limb or flexion of knee.		
		Internal cartilage more commonly affected.		
		Symptoms resemble those produced by loose cartilage in the joint.		
		Displacement can sometimes be recognized by palpation.		
Patella.	{	Locking of joint can be relieved by manipulation.		
		Recurrence is prevented by proper external support or operation.		
		Incision along outer side of the patella, followed by excision or suturing of cartilage.		
		Direction of displacement.—Outward; inward; vertical.		
		Outward.	{	More frequent than displacement to the inner side.
				May be complete or incomplete.
				When complete, patella rests against outer surface of external condyle.
				Knee may be extended or flexed at right angle.
				Internal lateral ligament of patella is ruptured longitudinally.
				Diagnosis presents no difficulties.
	{	Reduction by relaxing quadriceps and direct pressure.		
		Incomplete form often habitual.		

Patella (continued).	Vertical.	Patella displaced outward and turned upon its longitudinal axis. Its inner border rests on the groove of the trochlea, its outer border projects forward, and articular surface faces outward. Degree of rotation varies from 45° to 110°. Reduction by extension of knee and direct pressure on patella. Two cases of complete reversal have been reported.	
		— Same as outward, but less frequent.	
	Inward.	Congenital form exceedingly rare. Causes of habitual luxation obscure. In some cases it is genu valgum; in others it develops very gradually. Function of limb is impaired. Knee-cap or splint limiting motion of knee. Excision of a portion of internal lateral ligament of patella.	
	Congenital and pathological.		
Fibula.	Upper end.	Outward and forward.	{ In seven reported cases injury associated with forcible depression and inversion of front part of foot. Reduction by direct pressure.
		Backward.	{ In three of the five cases reported caused by contraction of biceps. Reduction easy; recurrence liable to take place.
	Lower end.	Upward.	— Three reported cases; diagnosis positive only in one.
			{ A few cases of backward dislocation have been reported. In one case fibular end retained its relation to foot (Stimson).
Foot.	Tibio-tarsal.	Backward.	{ Commonly caused by extreme plantar flexion. Fracture of external, less frequently of internal malleolus may coexist. Incomplete dislocation often present in Pott's fracture. Foot appears shortened in front, heel lengthwise.
		Forward.	{ Very rare. Caused by exaggerated dorsal flexion or direct pressure. Foot appears lengthened in front, heel shortened. Body of astragalus can be felt in front of tibia.
		Inward.	{ Two varieties. In one, astragalus lies in front and below external malleolus. In the other, toes are turned more or less directly inward, the foot lying nearly or quite in the transverse plane.
		Outward.	— Almost all cases described have been instances of Pott's fracture.

Foot (con- tinued).	Subastragaloid.	Forms. { Backward. Forward. Outward. Inward and backward.	<p>In all these forms remaining bones of foot are displaced from astragalus in respective directions. First two forms are very rare.</p> <p>Outward and inward are more common, and are produced by forcible eversion and inversion of foot. Fractures of astragalus and external malleolus are complications.</p> <p>Of fifty-five reported cases of all kinds, twenty-four were compound (Stimson).</p> <p>Of twenty-four simple cases in which reduction was attempted, it was effected in fourteen, and ultimate result was good.</p> <p>Secondary amputation was done in four, and secondary excision of astragalus in four, in remain- ing cases.</p> <p>Of the compound cases, primary excision in three, and excision of astragalus in ten.</p> <p>Comparatively of common occurrence.</p> <p>Caused usually by a fall from a height or forcible twisting of foot.</p> <p>Varieties depend upon direction of displacement and manner of production.</p>
	Astragalus.	Outward and forward. { Inward and forward. { Forward. — Backward. { Dislocation by rotation. {	<p>Is the most common form.</p> <p>Head of astragalus rests on outer cuneiform and cuboid.</p> <p>Its posterior part remains in contact with tibia.</p> <p>Foot is adducted and inverted, external malleolus prominent.</p> <p>Reduction by traction and pressure.</p> <p>Astragalus in front of or below internal malleolus.</p> <p>Foot is abducted and everted.</p> <p>Sometimes head passes beyond the tendon of tibialis anticus, which then pre- vents reduction.</p> <p>Very rare.</p> <p>Displacement backward or backward and toward either side.</p> <p>Of sixteen cases reported, in seven the neck was broken (Stimson).</p> <p>In three cases persistent flexion of terminal phalanx of great toe was present.</p> <p>Reduction was effected in only one-third of simple cases.</p> <p>Rotation may take place about vertical or transverse axis or antero-posterior axis.</p> <p>In three of the latter form upper surface of astragalus was directed inward.</p> <p>In one the bone was turned completely over.</p>

Tarsus and metatarsus.	{	Medio-tarsal joint.
		All of the tarsal bones, with the exception of the outer cuneiform, have been separately found dislocated.
		All of the metatarsal bones are separately liable to dislocation.
		The metatarsus as a whole has been dislocated in each of the four principal directions.

DISEASES AND INJURIES OF LYMPHATICS.

Rupture of thoracic duct.	{	Causes.	{	General remarks on structure and distribution.
				Incised, punctured, lacerated, and gunshot wounds.
				Fracture of the vertebræ.
				Subcutaneous crushing wounds.
	{	Symptoms.	{	Marasmus.
				Chylothorax.
				Chylous ascites.
				Accumulation of chyle in retroperitoneal space.
	{	Prognosis.	—	Recovery possible only in case wound is small.
				Starvation diet.
		Treatment.	{	Packing of wound with iodoform gauze, if the injury is inaccessible.
Lymphangitis.	{	Anatomical varieties.	{	Erysipelas.
				Reticular. { Erysipeloid (Rosenbach).
				{ Infection from certain poisoned wounds.
				Tubular. —Complicated by perilymphangitis.
		Symptoms.	{	Chill (quite common).
				Fever (variable in intensity).
				Swelling; redness.
				Suppuration (if resolution fails to take place).
		Diagnosis.	{	Tender red streaks in tubular variety.
				Diffuse redness in diffuse variety.
				Phlebitis.
				If deep lymphatics are affected, swelling is greater.
				Superficial and deep may be affected at same time.

Lymphangitis (continued).	Prognosis.	<ul style="list-style-type: none"> General condition of patient. Nature and virulence of microbic cause. Phlegmonous abscess. Metastatic abscess.
	Treatment.	<ul style="list-style-type: none"> Disinfection of infection-atrium. Rest and elevation of limb. Antiseptic fomentations. Application of cold. Incision and drainage of abscess. Enucleation of suppurative glands. Stimulants and tonics are required.
Lymphadenitis.	Etiological varieties.	<ul style="list-style-type: none"> Irritative: over-exertion, slight microbic infection. Suppurative: pus-microbes. Tubercular: bacillus tuberculosis. Syphilitic: virus of syphilis. Glandrous: bacillus mallei.
	Symptoms.	<ul style="list-style-type: none"> Pain; heat; swelling; redness. Periadenitis; fluctuation. Multiplicity of affection.
Lymphangiectasis and lymphangioma.	Treatment.	<ul style="list-style-type: none"> General symptoms. Removal of primary cause if possible. Application of cold. Parenchymatous injection. Incision and drainage by iodoform gauze tampon. Enucleation of gland.
	Varieties.	<ul style="list-style-type: none"> Lymphorrhagia: surface of skin. Chyluria: urinary organs. Chylocele: tunica vaginalis. Macroglossia: tongue. Macrocheilia: lips.
	Symptoms.	<ul style="list-style-type: none"> Lymphoedema. Hypertrophy of connective tissue and skin. Elephantiasis arabum (lower extremity; scrotum). Superficial inflammation and lymphangitis.

Lymphangiectasis and lymphangioma (continued).	{	Causes.	{ Congenital, inflammatory, and thrombosis. Pressure from without. { Tumors. Cicatricial contraction.
		Treatment.	{ Filaria sanguinis hominis. Elevation of limb and elastic compression. Ligation of principal artery. Cuneiform incision. { Tongue. Lips. Amputation. { Limb. Scrotum.
Pseudo-leukæmia or Hodgkin's disease.	{	Cause.	— Microbic.
	{	Diagnosis.	— Progressive enlargement of lymphatic glands in different regions.
	{	Treatment.	— Parenchymatous and internal use of arsenic.
Tumors of lymphatic glands.	{	Lymphoma usually only one tumor—slow growth.	
	{	Lymphosarcoma, successive enlargement of glands—rapid growth.	

DISEASES AND INJURIES OF THE HEAD.

General remarks.	{	Protecting coverings of brain.	
		Elasticity of cranial bones.	
		Direct fractures and fractures by contre-coup.	
		Intracranial tension.	{ Diminished. Increased.
Cerebral topography.	{	Modern cerebral.	{ Broca, Fritsch, Ferrein, Macewen, Goltz, Hitzig, Horsley.
		Cerebral localization, 1884.	
		Fissure of Bichat.	{ Line drawn from the external occipital protuberance to the external auditory meatus.
		Fissure of Rolando.	{ Half an inch behind the middle point between glabella and the occipital protuberance downward and forward at an angle of 67°.
		Fissure of Sylvius.	{ Line from the external angular process to the occipital protuberance, and a line 1½ inches behind external angular process to the parietal eminence, marks the line of this fissure.

Cerebral topography
(continued).

Precentral sulcus.

Frontal sulci. { Superior.
 { Inferior.Intraparietal fissure. { Posterior boundary from motor region from junction of middle and inferior
 { third of fissure of Rolando toward parietal eminence.Motor areas. { Upper third of fissure of Rolando—leg.
 { Middle third of fissure of Rolando—arm.
 { Lower third of fissure of Rolando—face and larynx.
 { Vision-cuneus.
 { Hearing—first temporo-sphenoidal convolution.Shaving of head. { As an aid to diagnosis.
 { First step in disinfection.

Full antiseptic precautions.

Elevation of head and chest during operation.

Marking of head before flap is raised.

Flap horseshoe-shaped, base below, and including periosteum.

Arrest of hemorrhage.

Opening of skull. { Trephine.
 { Chisel.
 { Rongeur forceps (Keen's).

Subcranial exploration.

Incision of dura when necessary—semicircular.

Examination of brain by sight and touch.

Arrest of hemorrhage. { From middle meningeal artery.
 { From dura mater.
 { From brain.
 { From sinuses.

Absence or presence of cerebral bulging.

Consistence and color of brain.

Location of centres (motor) by faradization, using double electrode.

Removal of altered brain-tissue—tumor or contents of abscess or cyst.

Drainage only when positively indicated.

Reimplantation of bone removed.

Implantation of decalcified bone disk.

Technique of cerebral
operations.

Technique of cerebral operations (continued). { Osteoclastic closure of cranial bone defect (König).
 Closure of dural incision by interrupted catgut sutures.
 Closure of external wound, always provide free drainage.
 Antiseptic dressing retained down to dura by plaster-of-Paris cast cap.
 External use of dry cold.
 Absolute rest for patient.
 Removal of sutures.

Secondary operations.

Prevention of fungus cerebri by pericranial flap (Keen).

Limits of operative procedure.

Diseases of the scalp.	Tumors.	Retention cysts of sebaceous glands—enucleation. Dermoid cysts about angles of eyes—extirpation. Lipoma. Congenital cysts. Fibromata.—Hairy; pigmented. } Complete removal.			
		Pneumatocele.	Ten cases recorded (Treves). Spontaneous atrophy, establishing communication with mastoid cells.		
	Vascular tumors.		Physical signs.	Elastic. Tympanitic on percussion. May attain size of pigeon's egg.	
	Arterial varix or cirroid aneurysm.				
	Treatment.—Compression, with or without aspiration.				
			Diagnosis.	Bruit; pulsation; character of swelling.	
			Treatment.	Ligation of carotids unsatisfactory. Excision—good results. Galvano-puncture; subcutaneous ligation. Parenchymatous injection of alcohol or tr. ferrichlor.	
		Nævus.			
		Capillary. Venous. Arterial. } Treatment.	Excision. Ligation. Galvano-puncture. Cauterization. Injection of carbolic acid.		
	Lupus.				
		Attacks face more frequently than scalp. Differential diagnosis between epithelioma and syphilis. Treatment: excision, scraping, and cauterization.			

Microcephalus.	{ Description of condition of skull. Linear craniectomy (Lannelongue) when indicated and the technique of the operation.			
Osteomyelitis and periostitis.	{ Suppurative. Tubercular. Syphilitic.	{ Differential diagnosis between these forms. Treatment.	{ General. Local.	{ Incision. Removal of diseased bone. Restoration of lost bone.
Hypertrophy of cranial bones.—	Ostitis deformans (syphilis).			
Atrophy of skull-bones.	Senile marasmus; syphilis.			
Tumors of the skull.	{ Exostosis and enostosis. Sarcoma. Epithelioma.	{ Causes: trauma; true osteoma; syphilitic gummata. Treatment.	{ When of syphilitic origin, pot. iod. in large doses. Indication for operation. Starting-point of tumor.	{ Periosteum. Diploë, dura. Diagnosis. Treatment: early and complete extirpation. —Treatment: early and complete extirpation.
Diseases and malformations of the brain.	{ Meningocele. Encephalocele.—Sac contains brain-substance. Hydrencephalocele.—Interior of mass communicates with ventricles. Diagnosis. Treatment. Hydrocephalus.	{ Defect in skull. Sac. Contents. All of these affections congenital and in median line. Size of swelling. Pulsation. Effect of pressure. Excision. Injections of Morton's solution.	{ Sodium, grs. x; Potass. iodide, grs. xxx; Glycerin, ℥j.	{ Internal. Tapping.
			{ Through skull. Through thread of spinal cord.	

Injuries of the head.	Cephalhematoma.	{	Accumulation of blood and serum underneath the scalp.
	Caput succedaneum.		In new-born child usually disappears spontaneously.
		{	If not, aspirate and apply compression.
	Wounds of scalp.		Arrest of hemorrhage.
		{	Removal of foreign bodies.
			Careful disinfection, suturing, and dressing of wounds.
		{	Danger of extension of inflammation.
	Abscess of scalp.		Contents of skull.
		{	Free incision and drainage.
	Contusion of scalp.		— Local condition may simulate fracture.
	{	Felizet's method: skull filled with paraffin; degree of injury.	
		Injury of brain by contre-coup.	
Concussion or laceration of brain.		Symptoms: temporary unconsciousness, vomiting, pulse, pupils, and convulsions.	
		Prognosis.	
	{	Treatment. { Rest; ammonia.	
		Prevention of cerebral inflammation.	

FRACTURES OF THE SKULL.

Vault.	General remarks.	{	Injury of the cranial contents more important than fracture.
			Direct treatment of fractures and lesions of soft parts now generally followed.
			The extent of fracture is no indication of its gravity.
			Fracture may be either subcutaneous, compound, partial, or complete.
			Violence producing fracture may be either direct, indirect, or contre-coup.
	Varieties.	{	Fissures.
			Comminuted with or without depression.
			Displacement due to fracturing force.
			In fissure, cracked-pot resonance on percussion.
	Symptoms.	{	Depression of fragments.
			Escape of cerebro-spinal fluid. { Through the wound.
			Underneath the scalp.
Examination of compound fracture.			
Fracture of the internal table.			

Vault (continued).	Prognosis.	{ Extent of brain injury. Provisional callus slight or entirely wanting. Compound fractures attended by dangers of infection.
	Treatment.	{ Use of trephine during beginning of present century frequent. Stromeyer abolished the use of the instrument entirely. Positive indications for trephining. { Compound fractures. Subcutaneous fractures. Hemorrhage from the middle meningeal artery. General treatment. { Rest. Limited diet. Cathartics. External application of cold.
Base.	Traumatic varieties.	{ Extension from the skull. Indirect violence. Punctured.
	Symptoms.	{ Escape of cerebro-spinal fluid or brain through puncture. Escape of cerebro-spinal fluid or blood through external ear. For this to occur the drum must be ruptured. Paralysis. { Optic. Facial. Auditory nerve. Optic neuritis (Battle). Ecchymosis of eyelids and conjunctiva in fracture of orbital plates. Ecchymosis of mastoid region. Temperature. { First subnormal. Later increased.
	Prognosis.	— Always grave; mortality reduced by prophylactic treatment against infection.
	Treatment.	{ Disinfection of external wound and antiseptic dressing. Drainage, if need be, when indicated, by trephining above and below external meatus. Immobilization of head when the fracture is extensive. Symptomatic treatment.

SURGERY OF THE HEAD.

Compression of the brain.	{	Causes.	{	Intracranial hemorrhage. Depressed fracture of skull. Tumor; foreign bodies; inflammatory product.			
		Symptoms.	{	Unconsciousness; pupils dilated; skin hot and clammy. Breathing slow and stertorous. Pulse slow, full, and often irregular.			
				Condition of bladder and bowels. Hemiplegia. Monoplegia.			
				Differential diagnosis.	{	Alcoholic intoxication. Opium-poisoning. Uræmia.	
		Prognosis.	{			Cause of compression. Complicating injury of the brain.	
		Treatment.	{	Removal of cause. Prevention of inflammatory affections of the brain and its envelopes. Elevation or depression of fracture. Removal of blood tumor, or inflammatory clot.			
Traumatic or intracranial hemorrhage.	{	Extradural.	{	Cause.	— Rupture of middle meningeal artery, with or without fracture.		
				Symptoms.	{	Period of unconsciousness between accident and persistent coma. Clot at the base produces dilatation of pupil of same side. Hemiplegia of opposite side.	
						Aphasia of clot is on the left side. Pulse frequent; rise in temperature. Respiration slow and stertorous.	
		Treatment.	{	Expectant treatment: 147 cases, 131 died } (Weisman). Operative treatment: 110 cases, 32 died }			
				Trephining 1½ inches behind external angular process, and, if clot is not reached, trephine below parietal eminence.			
		Subdural.	{	Source of hemorrhage: middle meningeal, dural, or cerebral vessels. Symptoms: nearly same as above; prognosis guarded. Treatment: remove clot, and arrest hemorrhage by opening skull.			

Fungus cerebri or hernia cerebri.	{	Protrusion of brain and inflammatory product through dural and bone defect.	
		Prophylactic measures.	{ Strict asepsis. Closure of cranial defect by osteogenetic flap (Keen). Implantation of disk of decalcified bone.
	{	Description of fungus.	{ Shape. Color. Consistence. Pulsation.
		Treatment.	{ Antiseptic applications. Pressure. Removal by excision or cautery. By depression by sponges or dressing.

TRAUMATIC INFLAMMATION OF THE BRAIN AND ENVELOPES.

Anatomical varieties.	{	Encephalitis or cerebritis.	
		Cerebellitis.	
Causes.	{	Meningitis.	
		Pachymeningitis; leptomeningitis.—Arachnoid; pia mater.	
		Compound fractures of the skull.	
		Contusions and lacerations of the brain.	
Acute encephalitis.	{	Suppuration and inflammation of cranial bones.	
		Pyemia.	
	{	Symptoms.	{ Headache. Photophobia. Fever (103° to 104° F.). Pupils contracted. Delirium and restlessness. Coma.
		Differential diagnosis.—Uremia.	
		Treatment.	{ Rest; elevation of head; cathartics. Externally, ice-bag or coil. Venesection; local bleeding. Bromide of potash, calomel, chloral, and iodide of potassium.

Chronic encephalitis.	{	Causes.	{ Trauma. Infection with pus-microbes.
		Symptoms.	{ Headache; mental hebetude; choked disk. Irritability of temper. Chill; coma; localized paresis or paralysis.
		Treatment.	— Nearly same as in acute form.
Operative treatment in meningitis or en- cephalitis.	{	Indications.	{ Chronic forms: always. Acute forms: selected cases.
		Removal of suppurative foci.	{ Scalp. Cranial bones. Sinuses.
Abscess of brain.	{	Causes.	{ Nearly 50 per cent. from suppurative inflammation of middle ear. Compound fractures. Contusions: sometimes long interval.
		Location.	{ Extradural; subdural. Cerebral; cerebellar.
		Symptoms.	{ Temperature often subnormal; local temperature increased. Symptoms of cerebral compression; headache; slow pulse; Cheyne-Stokes. Convulsions and focal symptoms. Pain on percussion.
		Differential diagnosis.	— Meningitis; sinus phlebitis; tumors.
		Treatment.	{ Early cases by Dupuytren and Detmold.
			{ Trephining at point indicated by focal symptoms. Systematic exploration of brain (Fenger). Opening of abscess, drainage, and after-treatment.

CEREBRAL SURGERY.

Diseases of brain, meninges, and sinuses from suppurative disease of the ear.	{	General remarks.	{ Anatomical relations of internal ear to brain. Frequency of brain complications. Fœtid ear discharge not so dangerous as non-fœtid (Rohrer). Danger is greater in chronic cases. Abscess distant from surface of brain due to thrombosed veins (Barker).

Diseases of brain, meninges, and sinuses from suppurative disease of the ear (continued).	Meningitis from aural disease usually localized.		
	Cerebral abscess.	Location.	Temporo-sphenoidal lobe.
			Between two vertical lines corresponding to tragus, and two inches back of this point.
		Diagnosis.	Centre of abscess region $1\frac{1}{2}$ inches above and behind meatus.
			Clinical history: cessation of ear discharge.
			Fever, nausea, vomiting, headache, and tenderness.
			Temperature may become subnormal.
	Intellect dull, passing into coma.		
	Optic neuritis not constant.		
	Cerebellar abscess.	Treatment.	Convulsive twitchings and paralysis.
			Prophylactic.
		Diagnosis.	Operative treatment for mastoid disease.
			Description of this operation as practised by Horsley.
			For abscess skull should be opened $1\frac{1}{2}$ inches above and behind meatus.
			Exploration downward, forward, and inward from this point.
Extradural abscess.	Treatment.	Treatment of wounded lateral sinus.	
		Drainage and disinfection.	
	Diagnosis.	Same as cerebral abscess, except higher temperature.	
		Occipital headache and tenderness.	
		Skull should be opened midway between the tip of mastoid and external occipital protuberance.	
		Drainage and after-treatment same as in cerebral abscess.	
Pyemia and thrombosis of the lateral sinuses.	Treatment.	Temperature high; pain fixed above and behind the ear.	
		Tenderness and œdema of scalp; cerebral compression.	
	Symptoms.	Trephining of mastoid, and from here the disease should be followed into skull.	
		Treatment of sinus affection.	
		Clinical history: headache and tenderness.	
		Repeated chills followed by fever.	
Pyemia and thrombosis of the lateral sinuses.	Treatment.	Concomitant thrombosis in internal jugular vein.	
		Choked disk.	
		Opening of mastoid sinus (Lane, Ballance, Parker).	
Pyemia and thrombosis of the lateral sinuses.	Treatment.	Ligation of jugular below thrombosis.	
		Removal of thrombus above ligature.	

Surgery of lateral ventricles.	<div><div>Injuries of lateral ventricles not necessarily fatal. Mortality not more than 50 per cent. (Keen). Keen has established the possibility of drainage in proper cases. Tapping should be done by lateral route (Keen). Skull should be opened 1½ inches behind meatus and 1½ inches above Reid's base-line. Drainage: tubular or capillary.</div></div>
Intracranial tumors.	<div><div><div><div>Pathological varieties.</div><div><div>Tubercular, glioma, sarcoma. Carcinoma, cysts. Parasitic, gummatous, and other varieties.</div></div></div><div><div>Symptoms.</div><div><div>Headache constant and severe, diffused or localized. Pain increased by percussion. Vertigo common, and more frequent in cerebellar tumors. Vomiting. Epileptic convulsions when tumor causes convulsions. Choked disk nearly always on both sides. If this symptom is monocular, tumor is on opposite side.</div><div><div>Focal symptoms.</div><div><div>Hemianopsia, half vision-cuneus. Aphasia, tumor on left side third convolution. Paresis or paralysis. Anesthesia. Mental disturbances.</div><div><div>Word-deafness. Word-blindness. Agraphia. Apraxia.</div></div></div></div></div><div><div>Diagnosis.</div><div><div>Complexus of symptoms indicating presence of tumor. Location of tumor. Depth of tumor. Multiplicity and infiltration contraindicate operation (Bergman). Nature of the tumor. Size of tumor: tumors weighing four ounces have been successfully removed.</div></div><div><div>Prognosis.</div><div><div>Knapp's statistics: forty-six operations, of these thirty recovered. Time of operation: early operation necessary. Ultimate result good, if non-malignant tumor.</div></div></div></div></div></div></div>

Intracranial tumors (continued).	Operative treatment.	External incision.
		Opening in skull not less than $1\frac{1}{2}$ inches.
		Incision of dura.
		Enucleation or excision of tumor.
		Brain incision in deep tumors.
		If tumor cannot be removed, bone should not be replaced.

OPERATIONS FOR EPILEPSY.

Traumatic epilepsy.	Etiology.	Remote complication of trauma.
		Cicatrix in dura or brain.
		Depressed fragment or penetrating spicula of bone.
		Cicatrix in soft tissues outside of skull.
		Degeneration of cortex resulting from injury (Horsley).
	Diagnosis.	Cyst following blood-clot and thickening of skull.
		Central lesion corresponding to muscles primarily affected.
		Effect of excision of external scar.
		Search for other peripheral cause of irritation (Briggs).
		Curative effect of operation per se (White).
Jacksonian epilepsy.	Treatment.	Evidence of depression.
		Trephining; opening of dura.
		Excision of dural or cerebral scar.
		Removal of damaged brain-tissue, especially antero-posterior; arrest of hemorrhage.
		Drainage usually superfluous.
	Definition.	Implantation of bone if pressure is not feared.
		If lesion lies over lateral zones, complete brain operation.
		Secondary operations and their indications.
		Spasm of certain muscles without loss of consciousness.
		Cerebral localization to determine seat of lesion.
	Diagnosis.	Cerebral localization for operative purposes by faradization of cortex.
		Excision of cortical centre.
	Treatment.	Paralysis always follows, but disappears later.
		Importance of careful observation of patient before operation.

Focal epilepsy.	{	Definition.	{ Non-traumatic lesion of cortex, manifested by focal symptoms, pointing to localized lesion preceding general attack.
		Diagnosis.	{ Importance of careful observation by competent person. Part first affected must be carefully localized after exposure.
		Treatment.	{ Excision of cortex corresponding to part first affected. Dura should be sutured.

TREPHINING FOR OTHER BRAIN AFFECTIONS.

Inveterate headache.	{	In the absence of well-defined lesions operations are to be limited to cases in which the pain is intense and localized, and not of a hysterical nature.	
Insanity and other mental disturbances.	{	Operations only indicated when the result of a trauma or other localized intracranial conditions.	
Arrested development.	{	Operation indicated when the result of trauma.	{ Felkin. Hare.
		Operation contraindicated when this condition is of congenital origin.	

SURGERY OF THE SPINE.

Anatomical varieties.	{	Relation to other parts of skeleton.			
		Intervertebral disks.			
		Three normal curves; spinal muscles.			
		Spinal cord and its envelopes.			
		Spinal nerves.			
Spina bifida.	{	Congenital bone-defect at centre of column, usually involving arches.			
		Lumbar portion furnishes one-half of all cases.			
		Next in frequency the sacral.			
		The swelling varies in size from a walnut to a child's head.			
		Structure of swelling.	{	Covering.	{ Skin.
					{ Spinal meninges.
	{	Contents.	{ Cerebro-spinal fluid.		
			{ Cord substance and nerves.		

Spina bifida (continued).	Anatomical varieties.	<ul style="list-style-type: none"> Spinal meningocele—meninges and fluid. Meningo-myelocele—cord and envelopes most frequent. Syringo-myelocele—dilatation central canal.
	Diagnosis.	<ul style="list-style-type: none"> Swelling congenital. Central location. Effects of pressure. <ul style="list-style-type: none"> Reduces size of swelling. Produces increased intracranial tension. Bone defect at base of swelling. Complicated often by other deformities. Cutaneous covering often absent.
	Treatment.	<ul style="list-style-type: none"> Protection of swelling and elastic support. Injection into sac. <ul style="list-style-type: none"> R. Iodine, grs. x ; Pot. iodide, grs. lx ; Glycerin, ʒj. ʒj at a time. Injection to be repeated if necessary every ten days. Excision of sac with preservation of nerves (Bayer). Excision followed by osteoplastic operation.
Special tumors.	<ul style="list-style-type: none"> Lipomata—in sacral region of extra- or intraspinal origin. Dermoid cysts—may communicate with rectum or bladder. Congenital sacral tumors—in region of coccyx, sometimes pedunculated. Fœtal tumors—inclusive of part of fœtus. Careful differential diagnosis and indications for operations. 	
	Tumor of spinal cord.	<ul style="list-style-type: none"> Anatomical varieties. <ul style="list-style-type: none"> Intramedullary. Extramedullary.
		<ul style="list-style-type: none"> Diagnosis. <ul style="list-style-type: none"> Gradual onset of motor paralysis first. Symptoms unilateral. Burning and shooting pain. Reflexes first aggravated. Spasms with clonus. Extradural variety, irritation predominates. Operative treatment. <ul style="list-style-type: none"> Exploratory and curative.

Neuralgia.	{ Brachial plexus. } { Lumbar plexus. } With or without spasms. { Operative treatment by intraspinal section should be limited to desperate cases. Five cases on record; only in two improvement followed.
Scoliosis or lateral curvature of the spine.	{ Varieties. { Curves. { Single. { { Double, second compensatory. { Rotation of spine. { Distortion of thorax. { Causes. { Predisposing. { General period of weakness. { { Period of growth. { { Rachitis. { { Habitual faulty position of body (school-room). { { Asymmetry of limbs. { { Unilateral muscular atrophy. { { Exciting. { Unilateral muscular hypertrophy. { { Spasm from central disease. { { Sacro-iliac disease. { { Empyema and tumors of side of trunk. { Symptoms. { Prominence of scapula of one side or opposite iliac crest. { { Deviations from normal lines of spinous processes. { { In advanced cases these conditions are aggravated. { Treatment. { Prophylactic. { { Removal of cause; restoration of symmetry of limb by high soles. { { Gymnastic exercise. { { Massage and faradization. { { Extension of spine. { { Indications for the employment of spinal jacket. { Causes. { Fracture of spine; rachitis; occupations. { { Habitual malposition of spine. { { Spondylitis deformans; rheumatic arthritis of spine (Treeves). { Pathology: ligaments, intervertebral cartilage, and vertebral bodies. { Diagnosis: character of curve, age, and occupation. { Treatment. { General treatment. { { Removal of cause—Rachitis; rheumatism; habits.

Anterior curvature or lordosis.	{	Causes.	{ Congenital; rachitis. Compensatory to deformity of Pott's disease. Ankylosis of hip-joint in partial flexion.	
			Treatment.—Special orthopedic treatment seldom necessary.	
Tubercular spondy- litis (Pott's dis- ease).	{	Causes.	{ Tubercular infection—essential cause. Age, trauma—often exciting cause.	
			Preliminary starting-point of disease. { Cancellated structure of bodies of vertebra. Periosteum.	
		Pathology.	Healing of primary focus.	
			Caseation and loss of bone-substance and intervertebral cartilage.	
			Liquefaction of tubercular product and sequestration of bone.	
			Tubercular spinal abscess.	
		Symptoms.	Pain in regions supplied by nerves arising from affected segment of cord.	
			Increase of pain upon movement during flexion and rotation of spine.	
			Involuntary immobilization of spine.	
			Involuntary transference of weight above disease to the pelvis by means of the arms.	
		Migration of spinal ab- scess.	Deformity.	
			Retropharyngeal.	
Lumbar.				
Psoas.				
Iliac.				
Paralysis.	Ilio-psoas.			
	Other routes.			
Differential diagnosis.	— Always motor first, caused chiefly by pachymeningitis.			
	{ Aneurysm of thoracic or abdominal aorta. Rachitis; lateral curvature; neuralgia. Paranephritic and subdiaphragmatic abscess.			
Treatment.	{	Indications.	{ Limit the destruction of tissue and resulting deformity. Influence favorably tubercular inflammation. Promote ankylosis; evacuate pus; direct treatment of focus. Remove causes which compress the cord.	

Tubercular spondylitis (Pott's disease) (continued).	Treatment. (continued).	Rest.	<ul style="list-style-type: none"> Recumbent position combined with extension upon Rauchfuss's sling. Extension of spine and application of plaster-of-Paris jacket. Jackets of other material—leather, felt, etc.—over-mould (Sayre). Use of jury-mast.
		Treatment of spinal abscess.	<ul style="list-style-type: none"> Aspiration and injection of iodoform emulsion. Incision, scraping, and drainage.
		Removal of tubercular focus seldom possible.	
		Treatment of paraplegia.	<ul style="list-style-type: none"> Extension. Laminectomy. Removal of tubercular tissues underneath arches.
Sprain of spine.	Treatment.	<ul style="list-style-type: none"> Rest; stimulating liniments. Dry cupping; laxatives. 	
	Remote symptoms.	<ul style="list-style-type: none"> Neurasthenic hysteria (Thorburn). Traumatic hysteria. 	<ul style="list-style-type: none"> Weakness, loss of memory, mental confusion, insomnia, etc. Due to cortical lesions manifested by well-defined focal symptoms, including paralysis, contractions, epileptiform convulsions. Charcot regarded it as analogous to a slight attack of hypnotism.
	Treatment.	<ul style="list-style-type: none"> Isolation of patient. Rest cure (Weir Mitchell). 	
Concussion.			<ul style="list-style-type: none"> Of rare occurrence, owing to efficient protection of cord. Usually conditions classified under this name are attended by anatomical lesions. Symptoms same as in a moderate degree of shock. Numbness, tingling or loss of power in lower or upper extremities. Treatment: same as in sprain.

Contusion.	<ul style="list-style-type: none"> Causes. <ul style="list-style-type: none"> Spinal sprains. Forced flexion. Symptoms. <ul style="list-style-type: none"> Due to laceration of cord substances. Due to hemorrhage and hemilomyelia. Motor and sensory paralysis and diminution of reflexes. Remote symptoms.—Caused by acute traumatic myelitis and degenerative lesions of the cord. Prognosis.—Favorable if symptoms set in at middle of second week.
Wounds.	<ul style="list-style-type: none"> Most exposed region between occiput and axis. Gunshot and stab wounds most frequent cause. Prognosis.—Extremely grave.
Compression.	<ul style="list-style-type: none"> Hemorrhage. <ul style="list-style-type: none"> Parenchymatous. <ul style="list-style-type: none"> Onset sudden, trauma or disease of cord. Peripheral symptoms bilateral. Spasm, rigidity, and paralysis in rapid succession. Meningeal. <ul style="list-style-type: none"> Sudden and violent pain more or less diffused. Pain along the course of nerves. Abnormal sensations. Muscular spasms. General convulsive movements. Spasmodic retention of urine; incomplete paralysis. Treatment. <ul style="list-style-type: none"> In severe cases direct measures are justifiable. Persistent paraplegia furnishes some indications. Inflammatory product. <ul style="list-style-type: none"> Following trauma; attending Pott's disease. Transverse myelitis occasionally results from meningitis.
Fractures of the spine.	<ul style="list-style-type: none"> General remarks. <ul style="list-style-type: none"> In frequency only constitutes 3.3 per cent. of 52,000 fractures treated in London hospitals. Cervical and dorsal vertebræ most frequent seat. In most cases the bodies of the vertebræ seat of fracture. Direct violence most frequent cause of fracture of arches. Causes. <ul style="list-style-type: none"> Forced flexion of spine, which also causes ruptures of ligaments and muscles. Upper part of spine slips forward, pinching cord between the arch below and fractured body. Direct violence in fracture of arches.

Fractures of the spine (continued).	Symptoms.	Pain increased by motion.
		Tenderness and ecchymosis.
		Paralysis of sensation and motion more or less complete.
		Kyphosis.
		Deviation of spinous process laterally.
		Retention of urine and disorders of sexual organs.
	Prognosis.	Reduction of fracture by extension.
		Water-bed.
		Aseptic cauterization.
		Prevention and treatment of decubitus.
		Fixation of spine by dorsal plaster-of-Paris splint.
		Treatment by inclined plane and extension.
	Treatment.	White reports 37 operations—6 recoveries, 6 beneficial, 11 unimproved, 14 deaths.
		Only useful when cord is not crushed.
		Lowenstein's rule: when six to ten weeks no improvement follows.
		Technique of operation.

REGIONAL STUDY OF FRACTURES OF SPINE.

Lower three lumbar vertebræ of rare occurrence; prognosis favorable.

Between second lumbar and tenth dorsal. { Paralysis below lumbar and sacral nerves, involving rectum and bladder.
 Danger from cystitis and decubitus.
 Prognosis: decidedly unfavorable.

Dorsal vertebræ. { In fractures involving upper vertebræ the abdominal muscles paralyzed.
 Intestines tympanitic.
 Hypostatic congestion additional source of danger.
 Danger to life greater than in dorso-lumbar.

Cervical and cervico-dorsal. { Paralysis of sensation high and often asymmetrical.
 Zone of hyperesthesia often above paralyzed area.
 In lower cervical upper extremities involved.
 First dorsal supplies interossei and intrinsic hand muscles.
 Thorburn's table of nerves supplying upper limbs.

- Atlas and axis. { In fracture above fourth vertebra death occurs immediately or within two weeks.
 Fractures of the upper two especially dangerous.
 Complete paralysis below the fracture.
 Pharyngeal wall often displaced forward.

DISLOCATION OF VERTEBRÆ.

- Complications. { Usually associated with fracture.
 Uncomplicated cases usually in cervical regions; rupture of ligaments, muscles, nerves, and vessels.
- Causes. { Extreme flexion.
 Extreme extension.
 Extreme lateral motion.
 Extreme rotation.
- Symptoms. { Deformity.
 Crepitus.
 Preternatural mobility.
 Deviation of lateral and spinous processes.
 Rigidity of spine at seat of injury.
 Paresis and paralysis.
- Treatment. { Reduction. { Traction.
 Flexion.
 Rotation.
 Direct pressure.
 Fixation of spine.
 Direct operative procedure to affect reduction and correct serious complications.

SURGERY OF THE NOSE.

- Frontal sinuses. { Injuries. { Fracture—emphysema a frequent symptom.
 Operation necessary, if posterior wall is injured and dura exposed.
 Fistulous opening following compound fracture may require operative treatment.
- Foreign bodies. { Detached osteomata.
 Necrosed bone.
 Introduced from without; introduced from nose-parasites.

Frontal sinuses (continued).	{	Inflammation.	{	Varieties.	{	Acute: suppurative.				
				Symptoms.	{	Chronic: tubercular or syphilitic.				
						Pain.				
						Nasal catarrh.				
						Swelling and tenderness.				
						Fever.				
				Emphysema of sinus.	{	Cerebral complications.				
						Pressure symptoms.				
						Displacement of eye.				
				Treatment.	{	Atrophy of walls.				
Spontaneous evacuation.	{	Nose.								
	{	Orbit.								
					{	Ethmoid cells.				
					{	Removal of cause.				
						Trephining external surface, disinfection, and drainage.				
						In chronic cases resection of anterior wall may become necessary.				
		Retention-cyst: resulting from closure of nasal opening.								
		Tumors.	{	Myxoma.	Fibroma.	Osteoma.	Sarcoma.	Carcinoma.	{	Operative treatment often requires resection of anterior wall.

Ethmoidal cells.

— Usually involved by extension of disease from nasal passages.

Sphenoidal sinus.

Often affected in some way, as ethmoidal cells, but more accessible to direct treatment.
 Cerebro-spinal fluid often escapes through nasal passages when seat of fracture.
 Pulsating exophthalmos often results from injury to internal carotid or cavernous sinus.
 Caries and necrosis, associated sometimes with thrombosis of cavernous sinus.
 Emphysema of this sinus, often associated with severe headache, photophobia, and blepharospasm.

Routes to sinus for operative treatment. {

- Naso-pharynx.
- Orbit after enucleation.
- Nose—the last usually selected.

Antrum of Highmore or maxillary sinus.	Fracture.	
	Perforating wounds: gunshot, stab.	
	Elevation of depressed outer wall.	
	Foreign bodies.	<ul style="list-style-type: none"> Blood. Introduced from without. Necrosed bone. Parasites.
	Causes.	<ul style="list-style-type: none"> Extension of inflammation from nose. Caries of roots of teeth. Osteomyelitis of maxilla. Polypi. Trauma.
	Symptoms.	<ul style="list-style-type: none"> Pain radiating toward nose. Swelling; atrophy of bone. If nasal outlet is patulous, intermittent discharge of pus. Displacement of eyeball. Spontaneous perforations. Percussion. Translumination by electric light (McKaskey, Zinn).
	Treatment.	<ul style="list-style-type: none"> Local application. Extraction of affected tooth if of dental origin. If teeth are healthy, perforation above root of second bicuspid. Drainage better by making counter-opening into inferior meatus. Daily antiseptic irrigation.
Tumors of the antrum of Highmore.		
<ul style="list-style-type: none"> Start most frequently from shorter border. Of 303 cases, 133 carcinoma, 84 sarcomata, 32 osteomata, 20 cysts, 17 fibromata (Weber). Careful examination of nose and lymphatics should be made before deciding upon operation. Operation usually includes removal of upper jaw, although in benign tumors the growth may be removed through incision in cheek. 		
Injuries of the nose.	Wounds.	<ul style="list-style-type: none"> Careful reposition of parts and accurate suturing, and, if necessary, internal and external supports. Part of nose completely detached by sharp instrument should be replaced at once and sutured.
	Emphysema.	<ul style="list-style-type: none"> Occasionally attends fracture of nasal bones; may extend to face, eyes, and forehead. If no infection has occurred, air is promptly absorbed.

Rhinoplasty.	{	Indications.	{	Correction of congenital deformities.
			{	To repair effects of injury.
			{	To repair effects of disease.
		Extent of operation.	{	Restoration of parts of nose lost by injury or disease.
			{	Restoration of entire organ lost by injury or disease.
		Methods of partial rhinoplasty.	{	Removal of tissue when excess causes deformity.
			{	Replacing tissue usually from cheek.
		Methods of complete rhinoplasty.	{	Tagliacotian—from arm.
			{	Indian method—from forehead.
			{	Osteo-plastic flap from forehead (König).

SURGERY OF THE LARYNX.

Trachelocele.	{	Definition.	— Hernial protrusion of mucous membrane of trachea between two rings, or as a congenital formation.			
		Symptoms.	{	Usually unilateral.		
				Swelling compressible; size, pea to hen's egg.		
				Dyspnœa.		
Treatment.	{	Alteration of voice or aphonia.				
		Palliative—pressure.				
		Radical—excision (Linhart's case).				
Wounds and injuries.	{	Etiology.	{	Made from without.	{	Contused.
				{		Punctured.
						Incised.
					Made from within (foreign bodies).	
	Suicidal incised wounds.	{	Treatment.	{	Direction and location of incision.	
					Prognosis usually favorable, unless large vessels have been cut.	
					Arrest of hemorrhage.	
	{	{	{	Careful approximation of divided tissues.		
				Indications for low tracheotomy.		
				Tamponing of trachea in severe hemorrhage from internal wounds.		

Tracheotomy.	Definitions.	<ul style="list-style-type: none"> Tracheotomy: opening of trachea between cricoid cartilage and sternum. Laryngotomy: incision through cricothyroid membrane. Laryngo-tracheotomy: incision through cricoid and upper rings. Bronchotomy: incision of trachea through bronchial tubes (impracticable) (Willard).
	Indications.	<ul style="list-style-type: none"> Obstructive lesions. <ul style="list-style-type: none"> Acute. <ul style="list-style-type: none"> Croup; diphtheria. Edema; inflammatory stenosis. Chronic. <ul style="list-style-type: none"> Tuberculosis. Syphilis. Malignant disease. Cicatricial stenosis.
		<ul style="list-style-type: none"> Removal of foreign bodies. <ul style="list-style-type: none"> Larynx. Trachea. Bronchial tubes.
	Site of operation.	<ul style="list-style-type: none"> In urgent cases anywhere where trachea can be most readily reached. Point of selection. <ul style="list-style-type: none"> Above isthmus of thyroid. Cricoid and first ring or two of trachea. Through isthmus between two ligatures. Below isthmus when neck is long and trachea prominent.
	Technique of operation.	<ul style="list-style-type: none"> Anatomical remarks. Administration of anesthetic. Position of head and neck. External incision. Fixation and incision of trachea. Insertion of tube. Operation without tube. Removal of membranes. After-treatment. <ul style="list-style-type: none"> Warm moist air. Cleansing of tube. Tonics and stimulants.
Laryngectomy.	Indications.	<ul style="list-style-type: none"> Malignant disease limited to this organ. Cicatricial stenosis. Aggravated forms of tuberculosis. Necrosis.

Laryngectomy (continued).	Technique.	Preliminary tracheotomy. Long median incision from chin toward sternum. Division of isthmus of thyroid between two ligatures. Isolation of larynx. Separation of larynx from trachea and tamponing of latter. Section of tissue above larynx. Hæmostasis. Insertion of large tracheal tube. Tamponing of wound, leaving space for entrance into œsophagus.
	After-treatment.	Rectal-feeding for two days. Later, stomach-feeding through tube. Moist, warm air. Insertion of artificial larynx two or three weeks after operation. Gussenbauer's artificial larynx. Park's modification. Functional results.
Unilateral laryngectomy.	Indications. Technique. Results.	

INJURIES AND DISEASES OF THE CHEST, PLEURA, AND LUNGS.

Hydrothorax.	Causes.	Pleuritis. Tuberculosis. Malignant tumors.
	Signs and diagnosis.	Position of patient. Limitation of respiratory movement. Fulness or bulging of intercostal spaces. Displacement of apex of heart toward opposite side. Fremitus diminished or lost over areas of dulness. Edema on affected side speaks in favor of empyema. Dulness over area occupied by fluid. Change of dulness with position of patient.

Hydrothorax (continued).	Signs and diagnosis (continued).	<ul style="list-style-type: none"> Exaggerated vesicular resonance on opposite side. Respiratory murmur and transmission of voice-sounds diminished. Bronchial breathing over compressed lung. Exploratory puncture.
	Treatment.	<ul style="list-style-type: none"> Aspiration when fluid compromises the action of the lung and resists medical treatment. Aspiration and injection of iodoform-glycerin emulsion in tubercular cases.
Hemothorax.	Causes.	<ul style="list-style-type: none"> Wounds, subcutaneous and perforating. Pathological conditions.
	Diagnosis.	—Anæmia and signs indicating the presence of fluid in chest.
	Treatment.	<ul style="list-style-type: none"> Aspiration when hemorrhage has ceased and the presence of blood gives rise to pressure symptoms. Arrest of hemorrhage by direct measures—ligature, tampon. Rib resection and incision if blood has undergone putrefaction.
	Definition.	—Collection of pus in a cavity; if not specified, in the pleura.
Empyema.	Causes.	<ul style="list-style-type: none"> Direct infection through wound from within or without; traumatic. Primary infection of pleura with pus-microbes derived from the circulating blood. Extension of suppurative processes to pleura from lung or thoracic wall. Metastatic or pyæmic infection from distant pus-dépôt. Mixed infection following tuberculosis of lung or pleura.
	Diagnosis.	<ul style="list-style-type: none"> Evidences pointing to presence of fluid in pleural cavity. Symptoms of septic infection. Exploratory puncture.
	Prognosis.	<ul style="list-style-type: none"> Microbic cause or causes of infection. Age of patient. Condition of lung on affected side. Complications.
	Treatment.	<ul style="list-style-type: none"> Aspiration; aspiration followed by irrigation of pleural cavity. Incision and drainage (with or without rib-resection) in maxillary line, on a level with the sixth or eighth rib.
	Multiple rib resection or Estlander's operation.	<ul style="list-style-type: none"> Indications.—Chronic cases, with general thickening and imperfect expansion of lung.
		<ul style="list-style-type: none"> Technique. <ul style="list-style-type: none"> One or more vertical incisions. Division or partial removal of a number of ribs. Scraping of pleural cavity to clear it of attached or loose membranes. After-treatment.

Empyema (continued).	Thoracoplasty or Schede's operation.	Indications. { <ul style="list-style-type: none"> Unyielding chest-wall. Great thickening of pleura. Contracted lung. Failure of milder measures. Technique. { <ul style="list-style-type: none"> Large oval flap, base upward. Resection of chest-wall, including ribs. Disinfection of exposed cavity. Planting of cutaneous flap over exposed cavity.
Surgery of the lungs.	Pulmonary collapse.	Following penetrating wound. May require direct artificial respiration through tracheal tube by use of bellows.
	Pneumotomy.	Indications. { <ul style="list-style-type: none"> Pulmonary gangrene. Abscess of lung. Technique. { <ul style="list-style-type: none"> Localization of affection by physical signs. Rib resection. Exploratory punctures. Incision with Paquelin cautery.
	Pneumectomy.	Indications. { <ul style="list-style-type: none"> Malignant tumors. Tubercular foci if limited.
		Technique. { <ul style="list-style-type: none"> External incision. Rib resection. Excision of lung with thermo-cautery. After-treatment.
Intrathoracic tumors and swellings.	Anatomical location.	Visceral. { <ul style="list-style-type: none"> Pulmonary. Pleural. Thoracic wall. { <ul style="list-style-type: none"> Projecting toward pleural cavity. Projecting toward external surface.
	Pathological varieties.	Carcinoma. Sarcoma. Actinomyces. Syphilitic gummata. Hydatids (echinococcus). Retrosternal dermoids.

Surgical affections of the diaphragm.	{	Anatomical remarks.
		Congenital defects: diaphragmatic hernia.
		Paralysis.
		Wounds: involve adjacent cavities when perforating.
		Rupture.
		Direct operative interference in wounds and rupture has been made with success, and in selected cases is justifiable.

DISEASES AND INJURIES OF THE NECK.

Embryological re-marks.	{	Branchial clefts.	
		Branchial arches.	
Congenital malformations.	{	Branchial cysts.	Most common in region of hyoid bone.
			Ovoid or globular in shape and fluctuate on palpation.
			Inner surface lined with epithelial cells.
			Contain product of secretions of mucous membrane or skin, minus appendages of skin.
			Always in close relation with large vessels of neck.
Phlegmonous inflammation of connective tissue.	{	Branchial fistulæ.	Enucleation of cyst best treatment.
			If this is impracticable, free incision, cauterization, and packing.
			Persistence of branchial cleft in part or whole.
			Varieties: internal, external, complete.
			Discharge: glary mucus or muco-purulent.
			Radical cure by extirpation difficult.
			Incision and cauterization of mucous lining.
		Varieties.	— Primary; secondary; superficial; deep.
	{	Symptoms.	General location.
			Swelling, size, color, œdema.
			Fluctuation.
			Pressure symptoms.
			Exploratory puncture.
		Treatment.	Incision and drainage by small external incision and tunnelling deep tissues with hemostatic forceps.
			Counter-openings.

Ludwig's angina.	{ Septic inflammation of connective tissue around submaxillary gland, floor of mouth, and tongue. General and local symptoms. Early incision, multiple if necessary.	
Suppurative fistulae.	{ Usually lead to caseous tubercular glands. Should be treated by laying open tract, removal of remnants of gland, and scraping.	
Cicatrices.	{ Resulting from suppurating tubercular glands or gummata or burns. Treatment by excision and restoration of skin by Thiersch's grafts, flaps from vicinity or arm. Result of operation often impaired from formation of keloid tissue.	
Contusions.	{ Blows upon neck occasionally produce immediate death from shock. Fracture of hyoid bone or larynx as complications. Inflammatory swelling.	
Wounds.	Varieties.	{ Lacerated. Incised. Punctured. Deep and superficial.
	Diagnosis.	{ Location, depth, and extent of wound. Character of hemorrhage. Escape of air and food.
	Treatment.	Arrest of hemorrhage. { Pressure. Ligature. Tampon.
		Removal of foreign bodies except bullets. Careful suturing and dressing, with or without immobilization of neck.
Tumors.	Benign.	{ Lipoma. Chondroma. Fibroma. Papilloma.
	Malignant.	Carcinoma. { Surface epithelioma. Glandular from infection of peripheral tumor. Branchiogenous (Volkman).
		Sarcoma. { Connective tissue. Lympho-sarcoma.

Infective swellings.	Tuberculosis.	{		Infection atriūm: lips, teeth, pharynx, skin.
		{		Age of patient.
		{		Course of lymphatic chain or chains.
	Syphilis.	{		Successive enlargement of glands.
		{		Degenerative changes and secondary or mixed infection.
		{		Indications for operation.
	Pseudo-leukæmia or Hodgkin's disease.	{		Technique of operation.
		{		General treatment.
		{		Enlargement of glands in cases of chancre of lip, tongue, or mouth.
		{		Enlargement of post-cervical glands as a sign of constitutional syphilis.
		{		Enlargement of cervical and all other lymphatic glands as indicating same.
		{		Successive enlargement of glands in same region.
		{		Successive invasion of different regions.
		{		No retrograde changes in new tissue.
		{		Operation seldom if ever indicated.
	Parotid.	{		Relations of this gland to facial nerve and external carotid.
		{		Fistula of Stenson's duct. Agnew's operation, ligature from inside mouth, including duct, but not skin.
		{		Mumps in 3 per cent. metastatic affection of mamma or genitalia.
	Calculi.	{		Metastas following { Acute infectious diseases.
		{		{ Pyæmia.
		{		{ When and how incision shall be made.
	Tumors.	{		Tubercular.—By extension from adjacent tubercular glands.
		{		Location and size of calculus.
		{		Probing of Stenson's duct.
		{		Operative removal.—Through duct; by incision.
		{		Varieties: œdema, chondroma, fibroma, sarcoma and carcinoma.
		{		Diagnosis.
	Submaxillary.	{		Treatment. { Indications for operative procedure.
		{		{ Technique with special reference to facial nerve.
		{		Anatomical remarks.—Capsule; Wharton's duct; facial artery.
		{		Complete removal easier than that of parotid.
		{		Extension of malignant disease from jaw to gland, and <i>vice versa</i> .
		{		Removal of this gland often necessary in removal of submaxillary tubercular glands.

Thyroid gland.	Anatomical remarks.	<ul style="list-style-type: none"> Ductless gland. Isthmus corresponds to second tracheal ring. Accessory glands. Physiological importance.
	Thyroiditis.	<ul style="list-style-type: none"> Usually occurs during or soon after an attack of acute infectious disease. Symptoms. Early incision if suppuration takes place. Bacteriological investigations (Tavel). Mode of infection. Effect of inflammation upon struma.
	Strumitis.	<ul style="list-style-type: none"> Source of danger.
	Treatment.	<ul style="list-style-type: none"> Incision. Tracheotomy. Partial extirpation of struma.
	Varieties:	miasmatic (Kocher), parenchymatous, follicular, adenomatous, fibrinous, angiomaticous, cystic.
	Symptoms and diagnosis.	<ul style="list-style-type: none"> Size and number of swellings. Movements of swelling during deglutition. Attached only to trachea and larynx. Pressure symptoms. Pressure effects on trachea. In vascular form, bruit. Differentiation between benign and malignant forms.
	Bronchocele or goitre or struma.	<ul style="list-style-type: none"> Iodine internally and externally in miasmatic form. Parenchymatous injections of iodine; carbolic acid. Electrolysis.
	Treatment.	<ul style="list-style-type: none"> Enucleation of cysts and adenomata. Partial thyroidectomy. Complete removal of gland should not be done, for fear of causing cachexia or struma.
	Technique.	Ligation of thyroid arteries (Wöffler).
	Malignant tumors.	<ul style="list-style-type: none"> Carcinoma. Sarcoma.
	Indications for operation.	

SURGERY OF THE DIGESTIVE TRACT.

Hare-lip.	Embryological remarks.	<ul style="list-style-type: none"> Mandibular arch. <ul style="list-style-type: none"> Superior maxillary portion. Inferior maxillary portion. Buccal cleft.
	<p>Congenital defect resulting from non-union of mesial nasal process with superior maxillary process. Always occupies direction of naso-maxillary fissure. Varieties: single, double, complicated. Double variety usually associated with cleft palate. Description of cleft and nasal opening on affected side. Description of intermaxillary bone in double hare-lip. Age for operation—a few days to six months.</p>	
	Operation.	<ul style="list-style-type: none"> Anesthetic unnecessary. Manner of holding child. Paring of margins of cleft. Silkworm gut or silk sutures in place of pins. Separate sutures of catgut for mucous membrane. Methods (Malgaigne, Mirault). In double hare-lip mesial peninsula may often be preserved. If intermaxillary bone projects, it is either removed or replaced according to Bardeleben's method.
	Epithelioma.	<ul style="list-style-type: none"> Usually affects males and lower lip. Patients generally advanced in years. Description of primary induration and ulcer which follows glandular enlargement. Differential diagnosis.—Chancre; tuberculosis. Prognosis.—Favorable if thoroughly removed before glandular infection has occurred.
Tumors of the lips.	Treatment.	<ul style="list-style-type: none"> Thorough and early excision. Indications for removal of submaxillary and submental glands. Restoration of lower lip by Wölfler's method.
	<p>Nævi should be removed, preferably by excision.</p>	
	Retention cysts.	<ul style="list-style-type: none"> Location. Size. Contents. Treatment. <ul style="list-style-type: none"> Excision. Incision and cauterization with HNO_3.

Hypertrophy of lips.	{	If necessary the removal of an elliptical piece of mucous and submucous tissue in an horizontal direction will improve the appearance.
Wounds of the lips.	{	Sutures should include arteries. Parts must be carefully adjusted.
Malformations of the mouth.	{	Microstoma (small mouth). Macrostoma (large mouth). Hare-lip. Median fissure.
Deformities from burns.	{	Plastic operations for correction of deformity. Restoration of lower lip by Teale's method. Length, course, and termination of Stenson's duct.
Salivary fistula.	{	Causes. { Injury. { Operation. { Suppurative parotitis. Treatment. { Formation of internal opening by puncture, followed by daily probing; silk-thread seton { until permanent internal opening has been established.
Cancerum oris.	{	Very rare in this country. Usually follows acute infectious diseases in ill-fed children. Treatment. { Local: cauterization with bromine, followed by hot antiseptic fomentations. { General: stimulants and tonics.

SURGICAL AFFECTIONS OF THE TONGUE.

	{	Tongue-tie. { Organ cannot be protruded beyond incisors. { In dividing the frenum blunt-pointed scissors should be used, and directed away from { ranine arteries.
Malformations.	{	Macroglossia. { Congenital hypertrophy of tongue resulting from affection of lymphatics. { Growth slow but progressive. { Epilepsy a frequent accompaniment. { Changes in teeth and jaws. { Repeated attacks finally lead to ulceration. { Treatment. { Ligation of lingual arteries useless. { Excision of wedge-shaped piece and suturing.

Tumors and swellings.	Nævi.	Caustics and cautery to be used only in superficial variety. Excision, when practised, should be made through healthy tissue. Bloodless methods. { <ul style="list-style-type: none"> Ligation. Ecraseur. Galvano-cautery.
	Papilloma.	Hypertrophied papillæ. Differentiate from epithelioma. Treatment: excision preferable to ligation.
	Ranula.	Retention cyst of salivary gland ducts or sublingual mucous glands. Swelling occupies space underneath tongue, on side of frenum; excision of part of cyst-wall, and cauterization of interior with silver nitrate. Butlin and Bryan recommend seton.
Salivary calculus.		Has been found in all ducts of salivary glands, but most frequent in Wharton's duct. Consists chiefly of calcium phosphate and carbonate and magnesium phosphate. Eventually gives rise to inflammation. Removed by excision.
Sublingual cysts.		Most frequent location in region of hyoid bone. They are dermoid cysts, and may contain, besides epithelial débris, hair, teeth, and bone. Project toward mouth or submaxillary space. Although congenital in origin, develop and grow during adolescence. Removal by enucleation. If tumor is prominent in mouth, it may be removed from here and cavity packed with iodoform gauze. External removal to be done by vertical incision in median line.
Acute glossitis.		Rare; most common in adults. Results from local and general infection. Swelling comes on rapidly, and embarrasses breathing and deglutition. Usually terminates by resolution. May produce gangrene or abscess. Hemiglossitis is rare. General and local treatment. Incisions on each side of raphe afford great relief and hasten resolution.

- Syphilis. { Tertiary form shows itself most frequently by fissures.
These are either single or multiple, sensitive to touch, but not surrounded by zone of inflammation.
In diagnosis it is important to search for other syphilitic lesions.
Antiseptic treatment, locally 10-grain solution of chromic acid.
Ulceration and mucous tubercles in second stage.
Gummata and deep ulcers from breaking down of above are frequent tertiary manifestations.
Primary chancre of tongue presents all the conditions of the primary sore in other parts.
- Tuberculosis. { Most frequently tip and border of organ.
Granulations flabby; little or no induration at base.
It is a painful affection, and occurs most frequently in phthisical subjects.
Differentiation from epithelioma and actinomycosis.
Local use of cocaine, iodoform, and lactic acid.
- Epithelioma. { Begins as a small fissure, nodule, or ulcer, usually on border of tongue.
More frequent in males than females, in proportion of 247 to 46 (Barker).
Leucoma, leukoplakia buccalis, or psoriasis often precedes it.
Local irritation a fertile exciting cause.
Extension to lymphatics and adjacent parts.
Average duration of life without operation is one year to eighteen months.
Differentiation between traumatic ulcer, tuberculosis, and syphilis.
Prognosis influenced largely by performance of an early and thorough operation.
Excision the only proper treatment. Out of seventy cases, nine were in good health one year after operation (Butlin).
- Wounds. — Hemorrhage can usually be arrested by careful suturing, which is always necessary in large wounds.
- Operations on tongue. { Unilateral amputation of tongue through mouth by use of *écraseur* (Barker).
Removal of entire tongue through mouth by scissors (Whitehead).
Removal of entire tongue through submaxillary incision (Kocher).
Removal of tongue after division of the lower jaw through symphysis (Sédillot).

DISEASES OF THE JAWS.

- Congenital deformities. { Cleft palate.
Arrest of development of one or both sides of lower jaw.
Non-union of the two halves of lower jaw, with median fissure of lower lip.
Non-union of premaxillaries, with median fissure of upper lip.
Congenital dislocation in consequence of arrest of development.

Acquired deformities.	{	Caused by macroglossia.
	{	Caused by cicatricial contractions.
	{	Caused by tumors pressing on jaws.
	{	Caused by plastic periostitis.
Alveolar abscess.	{	Caused usually by caries of teeth.
	{	In treatment relief is afforded by incision, but offending cause should be removed.
	{	Causes. { Suppurative periostitis.
		{ Suppurative osteomyelitis.
		{ Fumes of phosphorus.
Necrosis.	{	Diagnosis. { Clinical history.
		{ Local conditions.
		{ Use of probe.
	{	Treatment. { Sequestrum should be detached before its removal is attempted.
		{ Whenever this can be done through mouth, this means should be adopted.
	{	This growth starts from alveolar periosteum, and not from gums.
Epulis.	{	Varieties. { Simple or fibroid, circumscribed, and of slow growth.
		{ Sarcomatous, grows rapidly, and presents fungous appearance.
	{	Treatment. { Thorough excision, which should include alveolar process.
		{ Operation can be done with cross-cutting bone forceps.
	{	Usually caused by displacement of permanent teeth.
Dentigerous cysts.	{	Tooth may be completely buried and encysted or partly exposed.
	{	Diagnosis requires careful examination of teeth, temporary and permanent.
	{	In doubtful cases incise growth for diagnostic purposes before making an extensive operation.
	{	Cyst occupies interior of bone, and causes atrophy of bone by pressure.
Cysts of lower jaw.	{	If it reaches surface, fluctuation is distinct.
	{	Exploratory puncture will often afford aid in diagnosis.
	{	Occur in solid tumors, both sarcoma and carcinoma.
Multilocular cysts.	{	Interior of cysts often occupied by masses of new bone.
	{	Excision of jaw for primary disease is the operation to be done.
	{	Benign. { Fibroma.
		{ Enchondroma.
		{ Osteoma.
Tumors.	{	Malignant. { Carcinoma.—From extension of epithelioma from adjacent gland or mucous membrane.
		{ Sarcoma.—Periosteal; myeloid.

DISEASES OF THE TEMPORO-MAXILLARY ARTICULATION.

Tubercular arthritis. — Very rare.

Rheumatic arthritis. { May affect one or both sides.
Is very painful.
Gives rise to deformity, but does not result in bony ankylosis.

Suppurative arthritis. { Occurs either as a primary affection or from extension of inflammation from contiguous parts.
Fibrous or osseous ankylosis usually results.
Early incision and drainage are indicated.

Ankylosis. { Varieties. { Fibrous.
Bony.
May affect one or both sides, and most frequently follows suppuration.
Treatment.—Fibrous variety may yield to use of mouth-gag and massage.
Bony variety. { Excision of V-shaped section from ascending ramus (Esmarch).
Section of bone with forceps through mouth (Rizzoli).

Permanent closure of jaws from cicatricial contraction. { Causes. { Ulceration. } Attending gangrenous stomatitis in early childhood.
Sloughing. }
Treatment. { Division of scar-tissue as well as plastic operations has not proven successful.
Esmarch's operation for ankylosis is recommended by Heath.

DISEASES OF THE PHARYNX.

Congenital malformations. { Branchial fistulæ—internal opening in lateral wall of pharynx.
Diverticula—usually congenital, and occupy branchial clefts.

Acute suppuration and abscess of tonsil. { Causes.
Symptoms.
Prognosis.—Edema of larynx may prove speedily fatal.
Treatment. { Local.
Incision—how to be made.

Hypertrophy of tonsils.	{	Causes.	{	Direct pressure.				
		Indications for tonsillotomy.						
		Technique of operation.						
		Ignipuncture.						
	{	Treatment of severe hemorrhage.	{	Use of styptics. { Perchloride of iron. Turpentine.				
					{	Compression forceps.		
							{	Ligation of carotid.
Malignant tumors.	{	Epithelioma.—Seldom a primary affection.	{					
		Sarcoma.—Most frequently as a lympho-sarcoma; may occur in the young.						
		Operative treatment.			{	Thorough removal can be effected best through external incision from ear along anterior border of sterno-mastoid four inches, joined by one along inferior border of jaw (Cheever).		
							Czerny and Mikulicz divide jaw in region of molar teeth.	
Retropharyngeal abscess.	{	Causes.	{	Tuberculosis of cervical vertebræ.				
					{	Suppurative adenitis.		
							Scarlatina.	
		Symptoms.	{	Swelling.				
					{	Dyspnœa and dysphagia.		
							Abscess may appear externally behind sterno-mastoid, or may travel toward posterior mediastinum.	
		Treatment.	{	Differential diagnosis—aneurysm.				
					{	Tapping or incision through mouth or neck.		
							{	Hilton recommends opening the neck with blunt instruments.
Retropharyngeal tumors should be removed through external incision.								

CONGENITAL DEFORMITIES AND DISEASES OF PALATE.

Degrees of congenital defect.	{	Bifid uvula.
		• Cleft of soft palate.
		Cleft of hard palate.
		Cleft of whole of roof of mouth.

Staphylorrhaphy.	{	Operation for closure of a cleft in the soft palate.
		Time of operation—when child is three or four years old.
		T. Marion Warren recommends division of levator and tensor palati muscles.
		Billroth removes with chisel part of pterygoid process to lessen tension still more.
		Head should be placed in Rose's position.
Uranoplasty.	{	Paring of margins.
		Insertion of silkworm sutures; after-treatment.
		Operation for closure of cleft in hard palate.
		Contraindications—very wide cleft.
		Paring of edges.
Ulceration.	{	Curved incision on each side along alveolar arch.
		Raising of muco-periosteal flap with periosteal elevator.
		Insertion of sutures as above.
		Packing of elliptical wounds with iodoform gauze.
		Syphilitic.
Necrosis.	{	Tubercular.
		Nearly always of syphilitic origin.
		Exfoliation takes place very slowly.
		Defect should be closed by plastic operation or obturator.
		Papilloma.
Tumors.	{	Sebaceous cysts.
		Sarcoma.
		Carcinoma.

DISEASES AND INJURIES OF THE ŒSOPHAGUS.

Malformations.	{	Fistulæ.
		Diverticula.
		Cystic growths.
		Congenital stenosis.
		Membranous septum.
Dilatation and sacculation.	{	In acquired varieties some form of obstruction exists below.
		In the treatment removal of obstruction is indicated.

Stricture.	{ Organic.—Cicatricial or simple; cancerous or malignant. Functional.—Spasmodic or hysterical.
Cicatricial stricture.	{ Causes. { Wounds. { Syphilitic ulceration. { Caustics. Location.—Usually at beginning of œsophagus or near stomach.
Malignant stricture.	{ Usually occurs in persons advanced in years. Most frequent location near a cardiac orifice. Difficulty in swallowing solid food and regurgitation. Progressive emaciation.
Spasmodic stricture.	{ One of the many manifestations of hysteria. More common in women than in men. Symptoms not constant. Bougie can be passed if pressure is continued.
Diagnosis of stricture.	{ Age of patient and clinical history. Impairment of function. Instrumental exploration.
Treatment.	{ In cicatricial variety gradual dilatation should be carried out if stricture is impermeable. If this cannot be done, gastrostomy and dilatation from below. In malignant strictures permanent tubage or gastrostomy.
Wounds.	{ If accessible, should be closed by suturing. If inaccessible, patient should be fed per rectum or through stomach-tube.
Foreign bodies.	{ Lodgment most frequent behind cricoid cartilage, left bronchus, or diaphragm. Death results sometimes from asphyxia. Ulceration and perforation as remote results. Diagnosis must rest on history of case and exploration of œsophagus. If object is round and smooth, and cannot be removed, should be pushed with probang into stomach. Extraction with œsophagus forceps or horse-hair probang. External œsophagotomy for removal of suspected bodies which cannot be dislodged or extracted by above methods.
External.	{ Œsophagotomy. Incision on left side, between trachea and larynx and great vessels, on a level with cricoid cartilage; œsophagus is incised.

- Internal. {
 - Œsophagotomy. Establishment of permanent external fistula, through which food can be introduced into stomach.
 - Œsophagotomy. Cutting cicatricial strictures from within is dangerous, and should not be resorted to.
 - Œsophagectomy. Excision of œsophagus. One successful case by Czerny.

DISEASES AND INJURIES OF THE ABDOMEN.

Wounds.	Non-penetrating.	Diagnosis.	<ul style="list-style-type: none"> Importance of correct diagnosis. Exploration under strictest antiseptic precautions. Nature of vulnerating implement. Location and direction of external wound. Method of exploring wound canal.
		Prognosis.	<ul style="list-style-type: none"> Absence of prolapse of any of the abdominal organs. Favorable if not complicated by internal injuries. Ventral hernia as a remote result.
		Treatment.	<ul style="list-style-type: none"> Accurate coaptation of the different tissues by buried sutures. External mechanical support to favor union and prevent hernia. Recumbent position continued requisite length of time.
	Penetrating.	Varieties.	<ul style="list-style-type: none"> Incised. Punctured. Gunshot. Stab. With and without visceral injuries.
		Diagnosis and symptoms.	<ul style="list-style-type: none"> Positive evidence of penetration. Emphysema. Prolapse of omentum or other intraperitoneal organs. Escape of contents of any of the hollow abdominal organs. Shock not a reliable symptom. Vomiting. Pallor and other evidence of acute anæmia. Presence of blood in the abdominal cavity. Hematemesis and hemorrhage from bowels. Gas in free abdominal cavity. Rectal insufflation of hydrogen gas. Inflation of stomach.

Wounds (continued).	Penetrating (continued).	Prognosis.	{ Presence or absence of visceral lesions. Internal hemorrhage. Time of examination or operation. Size of penetrating implement.	
			Indications for laparotomy.	{ Dangerous internal hemorrhage. Wounds of gastro-intestinal canal large enough to allow escape of contents.
		Treatment.		

INJURIES AND DISEASES OF THE STOMACH.

Subcutaneous laceration and rupture.	Causes.	{	Distension of organ by food.
		{	Blunt force applied over organ.
	Varieties.	{	Complete.
		{	Incomplete.
	Symptoms.	{	Pain.
		{	Circumscribed peritonitis.
		{	Hematemesis.
		{	Escape of stomach contents into peritoneal cavity.
	Treatment.	{	Laparotomy in complete rupture.
		{	Abstinence from food in incomplete variety.

Gunshot and stab wounds.	{	Diagnosis and symptoms.	{	Location and direction of wound.	
		Hematemesis.			
				Escape of contents externally or into peritoneal cavity.	
				Insufflation of hydrogen gas.	
		Treatment.	{	If stomach is empty and wound small, expectant plan will suffice.	
				Laparotomy and direct treatment of visceral wound in less favorable cases	
				Second wound should always be searched for.	
				Insufflation of organ is of great assistance in finding perforations.	
				After-treatment.	
Foreign bodies.	{	Dietetic treatment for.	{	Bread and milk.	
				Vienna treatment—mashed potatoes.	
		Gastrotomy.		Technique.	First performed by Florian Mathias in 1602.
	{	External*incision.			
		Visceral incision.			
		Extraction of foreign body.			
		Suturing of visceral and abdominal incision.			
Points of surgical interest.	{	Hemorrhage.	{		
		Perforation.			
		Cicatricial contraction.			
Ulcer.	{	Symptoms.	{	Pain.	
				Tenderness.	
				Vomiting soon after eating.	
				Hematemesis.	
		Surgical treatment.	{	Indications for { Arrest of hemorrhage.	
				Excision of ulcer (Rydygier).	
				Suturing of perforation.	
		Technique of operation.			
Cicatricial stenosis.	{	Location and symptoms.	{	Dilatation of stomach.	
				Pyloric orifice.	Vomiting two or more hours after eating.
					Hyperacidity of stomach contents as a rule.
				Cardiac orifice.	Progressive difficulty in swallowing solid food.
				Regurgitation soon after taking food.	
				Stomach contracted.	

Cicatricial stenosis (continued).	Diagnosis.	{ History of case usually points to former ulceration. Use of oesophageal bougies (cardiac end). Inflation of stomach (pyloric end).
	Treatment.	{ Pyloric stricture. { Restriction in diet. Lavage of stomach. Digital divulsion (Loreta). Pyloro-plasty (Heinske-Mikulicz). Gastro-enterostomy (Wölfler). Cardiac stricture. { Gradual dilatation. Gastrostomy. Dilatation of stricture from below.
Dilatation without mechanical obstruction.		{ Atony of wall of stomach. Diagnosis. Dietetic and medicinal treatment. Shortening vertical diameter by folding and suturing anterior wall (Bircher). Gastro-enterostomy.
	Anatomical location.	{ Cardiac extremity. Pyloric extremity. Large curvature.
Carcinoma.	Symptoms.	{ Vary according to location of disease. Vomiting. Distress after eating. Hematemesis. Tumor. Dilatation of stomach. Progressive marasmus.
	Treatment.	{ Dietetic. Lavage of stomach. Gastrostomy (cardiac carcinoma). Pylorotomy (pyloric carcinoma). Gastro-enterostomy. Gastrectomy—anterior wall of stomach.
Gastric fistula.		{ If closure is indicated, should be effected by: Application of actual cautery; suturing after freshening margins; suturing after detaching stomach.

Operations on stomach.	{	Gastrotomy.—Incision of stomach with immediate closure of visceral wound.
		Gastrorrhaphy.—Suturing of wound of stomach.
		Gastrostomy.—Formation of gastric fistula. { Fenger's method.
		{ Hahn's method.
		{ Witzel's method.
		Digital divulsion of pyloric stricture (Loreta, 1883).
		Pyloro-plasty.—Longitudinal incision and transverse suture of pylorus.
	{	Gastro-enterostomy. { Suturing (Wölfler).
		{ Apposition plates (Senn).
		Pylorectomy (Billroth).
	{	Gastrectomy.—Excision of part of wall of stomach.

INTESTINAL OBSTRUCTION.

Definition.	{	Varieties.	{	Acute.	{ Maximum symptoms reached in a few days.
					{ Usual seat at and above ileocæcal valve.
				Chronic.	{ Onset of symptoms slow; attacks increased in severity.
					{ More frequent location at and below ilio-cæcal region.

SURGICAL RESOURCES IN THE TREATMENT OF INTESTINAL OBSTRUCTION.

Lavage of stomach.	{	Introduced by Kussmaul.
		Removes weight and pressure on proximal side of obstruction.
		Siphon tube to be used.
		Safe antiseptic solution should be used after evacuation of stomach.
Distension of colon with fluids.	{	Best done in knee-elbow position.
		Capacity of normal colon in adult is about three to four quarts.
		Should be used to clear out colon below obstruction.
		Not as safe or efficient as hydrogen gas in reduction of invagination.
Rectal insufflation of air or hydrogen gas.	{	Useful in locating seat of obstruction.
		Applicable in recent cases of invagination.

Tubage of colon.	<ul style="list-style-type: none"> Introduced by O'Bierne. Tube cannot be passed beyond sigmoid flexure. Useful in locating obstruction below sigmoid flexure. Valuable in relieving gaseous distension of colon. Serviceable in administration of high nutrient enemata.
Manual exploration per rectum.	<ul style="list-style-type: none"> Introduced by Simon. Should be practiced only on adults, and by surgeons with hands of not more than seven inches circumference. Requires use of anesthetic. Hand should be introduced slowly and carefully. Cases to which this method is adapted. Indications as a therapeutic resource.
Taxis and massage.	<ul style="list-style-type: none"> Warmly advocated by Mr. J. Hutchinson. These measures should be used only in some certain cases of occlusion and dynamic obstruction.
Continuous compression of abdomen.	<ul style="list-style-type: none"> Most useful in chronic form. In after-treatment, after removal of obstruction by operation. Manner of application.
Puncture of intestine.	<ul style="list-style-type: none"> To be used only in exceptional cases when great distension is a marked feature. Always attended by danger of leakage if intestine is inflamed or parietic. Puncture should be made obliquely through intestinal wall.
Enterostomy.	<ul style="list-style-type: none"> Performed by Nélaton in 1840. Mortality has been great. Should be limited to cases in which laparotomy cannot be done on account of patient's great debility, and where obstruction cannot be removed or rendered harmless by intestinal anastomosis. Technique of operation. <ul style="list-style-type: none"> Incision on right side, above, and parallel to, Poupart's ligament. Fixation of bowel in wound. Opening of intestine. Difference between terms colotomy and colostomy. Indicated as a palliative measure in inoperable stricture of colon or rectum.
Colostomy.	<ul style="list-style-type: none"> Methods. <ul style="list-style-type: none"> Inguinal. <ul style="list-style-type: none"> Advantage over lumbar. Maydl's operation. <ul style="list-style-type: none"> External incision; bridge; suturing of peritoneal surface; incision of bowel; operation in two stages. Lumbar. <ul style="list-style-type: none"> Colon cannot always be reached by extraperitoneal incision. Technique of operation. <ul style="list-style-type: none"> In one sitting. In two stages.

Cœliotomy.	Used in this connection to signify opening of abdominal cavity for the purpose of finding and relieving the obstruction.	
	Mortality has been between 58 and 70 per cent.	
	Necessity of making careful preparations to meet all emergencies.	
	Measures to lessen shock.—Atropine, whiskey, and morphia.	
	Median incision always indicated if obstruction cannot be located beforehand.	
	Incision over colon if obstruction is located there.	
	If obstruction cannot be readily found, external incision must be enlarged and prolapsed intestine carefully protected.	
	Intestines are always distended above and collapsed below obstruction.	

OPERATIVE TREATMENT OF THE OBSTRUCTION.

Intestinal anastomosis.	Formation of opening between intestine above and below obstruction.	
	First practiced by Maisonneuve.	
	Substitutes for suturing in this operation.	<ul style="list-style-type: none"> Perforated decalcified bone-plates (Senn). Catgut rings (Abbe, Matas, Davis, and Brochow). Cartilage (Stamm). Untanned leather (Robinson). Swedish turnip (Baracz).
	This procedure is indicated in inoperable carcinoma of intestine as far as sigmoid flexure, and in non-malignant affections, in place of an enterectomy.	
Enterectomy.	Excision of a segment of bowel for disease or injury.	
	Indications.	<ul style="list-style-type: none"> Malignant tumors when growth can be completely removed. Non-malignant tumors that cannot be removed by enterotomy. Gangrene; localized tuberculosis.
	Incomplete enterectomy and its indications.	
	Technique.	Precautions against escape of intestinal contents.
		Preliminary ligation of mesentery in small sections with silk.
		Restoration of continuity of bowel.
		<ul style="list-style-type: none"> Circular enterorrhaphy. Lateral anastomosis. Lateral implantation.
	Indications for formation of artificial anus.	
	Average mortality not less than 55 per cent.	

Enterorrhaphy.	<p>Suturing of intestine. Circular enterorrhaphy—end-to-end suturing. Czerny suture (deep), including all coats except peritoneum. Lembert suture (superficial), including all coats except mucous. Lembert-Czerny suture, a combination of above. Large wounds should be closed by a double row. Small wounds can be safely closed by Lembert's alone. Best suturing material—fine aseptic silk. Best needle—an ordinary long cambric needle. Stitches should be cut close to the knot. Interrupted sutures are safer; continuous require less time. If one of the lumina is larger than the other, the smaller should be cut obliquely at the expense of convex side.</p>
Lateral implantation.	<p>Can be resorted to in case one end is much larger than the other, as is the case after excision of cæcum. In such a case colon is closed by inversion and suturing, and ilium is implanted in a small slit and sutured an inch or two above closed end of colon.</p>
Direct treatment of obstruction by band or diverticulum, flexion, or adhesion.	<p>Bands should not be divided, but excised. Diverticulum must be excised, and intestinal end carefully closed. Adhesions should be separated; if this is impossible, lateral implantation should be established. Flexion should be corrected; if this is impossible, continuity of bowel is restored by lateral anastomosis.</p>
Toilet of peritoneal cavity.	<p>If cavity is aseptic and no extravasation has taken place, flushing is unnecessary and wound is closed. If infection has taken place or extravasation has occurred during operation, copious flushing with warm sterilized water and drainage are necessary. Thiersch's solution, or a 1 : 5000 sublimate, are safe to use in peritoneal cavity after a thorough flushing.</p>
After-treatment.	<p>Absolute diet. Rectal feeding. Stimulants. Cathartics. Enemata. Opiates.</p>

ANATOMICO-PATHOLOGICAL FORMS OF INTESTINAL OBSTRUCTION.

Entero-lithiasis.	Varieties.	{ Biliary calculi. Intestinal concretions.
	Clinical history.	{ Progressive attacks of biliary colic. Symptoms pointing to gastrolith. Condition of urine indicative of location of enterolith. Degree of tympanites.
		{ Coeliotomy. Submural crushing of stone. Fragmentation of stone by needle (Tait). Enterotomy.—Incision through healthy portion of bowel. Enterorrhaphy. Enterectomy and circular enterorrhaphy.
	Treatment.	
Ascarides.	{ Report of cases by Halina, Saurel, Pockels, Stepp, and others. Always occurs in children. Use of anthelmintics. If these fail, laparotomy and enterotomy.	
	{ In large intestines, usually cæcum or sigmoid flexure. Congenital dilatation and constipation as causes. May give rise to ulceration and perforation.	
	{ Effects of pressure on swelling. Removal of feces per rectum by means of irrigation and scoop. Massage and electricity. Colotomy in desperate cases.	
Fæcal obstruction.	Varieties.	{ Single. Multiple. Ascending. Descending.
	Anatomical description.	{ Intussusciens. Intussusceptum. Neck.
Invagination or intussusception.	Causes.	{ Intestinal paresis. Intestinal spasm.

Invagination or intussusception (continued).	{ Spontaneous cure. { Spontaneous reduction. { Sloughing and elimination of intussusceptum. { Diagnosis. { Clinical history. { Character of fecal discharge. { Swelling. { Treatment. { Absorbents, diet, and small doses of opium. { Insufflation of air or hydrogen gas per rectum under anesthetic. { Laparotomy, direct reduction, resection, or anastomosis.
Volvulus.	{ Twisting of intestinal loop around the axis. { Most frequent location, lower portion of ilium or sigmoid flexure. { Causes. { Predisposing. — Long mesentery. { Exciting. { Accumulation of intestinal contents above narrowed portion of { bowel (Gravitz). { Adhesions of intestinal loop (Wieberding). { Symptoms. { Early and persistent vomiting. { Localized tympanites (Wahl). { Treatment. { Early operation. { Reduction of volvulus. { Prevention of recurrence by shortening mesentery, by folding and twisting. { If twist cannot be corrected, anastomosis. { If bowel is gangrenous, enterectomy.
Flexions and adhesions.	{ Previous attacks of peritonitis. { Immobilization of segment of bowel in blood-clot or inflammatory product. { Separation of adhesions and correction of flexion. { Indications for lateral approximation and anastomosis. { Precautions against recurrence of adhesions.
Strangulation by bands or di- verticula.	{ Formation of bands by inflammatory adhesions. { Location and description of omphalo-mesenteric vessels and diverticula. { Displaced hernial sac and adherent appendix vermiformis. { Manner of strangulation. { Treatment. { Early operation essential for success. { Bands should be excised between two ligatures. { Diverticula must receive special attention.

Non-malignant stenosis.	Forms.	<ul style="list-style-type: none"> Congenital.—Their frequency, location, and extent. Acquired.—Result from antecedent inflammation. <ul style="list-style-type: none"> Ulcerative. Plastic.
	Clinical history.	<ul style="list-style-type: none"> In congenital form symptoms of obstruction soon after birth. Typhoid fever. Dysentery. Tuberculosis. Syphilis.
	Treatment.	<ul style="list-style-type: none"> Enteroplasty by the Heineke-Mikulicz method. Intestinal anastomosis.
Tumors.	Benign.	<ul style="list-style-type: none"> Polypoid. Cystic. Removal by laparo-enterotomy.
	Malignant.	<ul style="list-style-type: none"> Carcinoma.—Starting in mucous membrane. Located most frequently. <ul style="list-style-type: none"> Ileo-cæcal region. Sigmoid flexure.
		<ul style="list-style-type: none"> Sarcoma.—Very rare; starts in connective tissue of intestinal wall, and affects upper part of intestine. Indications for radical operation. In inoperable cases anastomosis or artificial anus.
Adynamic intestinal obstruction.	<ul style="list-style-type: none"> Caused by paresis of intestinal wall. Prophylactic, medicinal, and surgical treatment. 	

APPENDICITIS.

Definition.	
Relation to	<ul style="list-style-type: none"> Typhlitis. Perityphlitis. Paratyphlitis. Appendicular peritonitis.
Etiology.	<ul style="list-style-type: none"> Age; very rare in infants. Catarrhal form often without mechanical injury. Fecal concretions—enteroliths. Foreign bodies—grape-seeds, cherry-stones, etc. Extension of inflammation from cæcum.

Pathology.	<ul style="list-style-type: none"> Most frequent cause of inflammation in ileo-cæcal region. If perforation takes place, peritoneal cavity is always more or less involved. Phlegmonous inflammation of post-cæcal cellular tissue. Course of such abscess in direction of Poupart's ligament behind cæcum. Perforation causes limited or diffuse peritonitis. Gangrene of appendix, how produced. Termination of inflammation without suppuration. Recurring appendicitis. 				
Symptoms and diagnosis.	<ul style="list-style-type: none"> Pain—McBurney's point. Rigidity of abdominal wall over ileo-cæcal region. Tympanites. Swelling not always present. Fluctuation generally absent or indistinct. Vomiting and constipation. Antecedent attacks. Symptoms indicating perforation. 				
Prognosis.	<ul style="list-style-type: none"> About one death out of seven or eight cases. General peritonitis usually proves fatal. Life is in danger if abscess ruptures into bladder or peritoneal cavity. Plastic localized peritonitis a favorable condition. In recurring peritonitis danger increases with each attack. 				
Treatment.	<table border="0"> <tr> <td>Medical.</td><td> <ul style="list-style-type: none"> Saline cathartics in early stage; enemata. Hot fomentations, with or without turpentine. Small doses of opium. Liquid diet and absolute rest. </td></tr> <tr> <td>Surgical.</td><td> <ul style="list-style-type: none"> Recurring appendicitis calls for removal of appendix. Willard Parker in 1867 advised free incision after formation of abscess. In recurring form removal of appendix necessitates opening of peritoneal cavity. Incision halfway between ant. sup. spine of ilium and umbilicus, 4 inches long, longitudinal. Closure of abdominal incision by buried sutures. In localized or diffuse peritonitis copious irrigation and drainage. If abscess is deep behind cæcum, extraperitoneal incision. Exploratory puncture should be made only after incision. If appendix cannot be removed, it should be incised and drained. </td></tr> </table>	Medical.	<ul style="list-style-type: none"> Saline cathartics in early stage; enemata. Hot fomentations, with or without turpentine. Small doses of opium. Liquid diet and absolute rest. 	Surgical.	<ul style="list-style-type: none"> Recurring appendicitis calls for removal of appendix. Willard Parker in 1867 advised free incision after formation of abscess. In recurring form removal of appendix necessitates opening of peritoneal cavity. Incision halfway between ant. sup. spine of ilium and umbilicus, 4 inches long, longitudinal. Closure of abdominal incision by buried sutures. In localized or diffuse peritonitis copious irrigation and drainage. If abscess is deep behind cæcum, extraperitoneal incision. Exploratory puncture should be made only after incision. If appendix cannot be removed, it should be incised and drained.
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FÆCAL FISTULA.

Definition.	Varieties. <ul style="list-style-type: none"> External.—On surface of body, usually in inguinal region. Internal. <ul style="list-style-type: none"> Bladder. Uterus. Vagina. Intestine—bimucous fistula (Dreschfeld).
Etiology.	<ul style="list-style-type: none"> Trauma.—Penetrating wounds, drainage-tubes, operations, etc. Intestinal tuberculosis. Intestinal actinomycosis. Strangulated hernia. Malignant tumors. Typhoid fever. Pelvic abscess.
Diagnosis.	<ul style="list-style-type: none"> Difference between fæcal fistula and artificial anus. Length of fistulous tract. Character of fæces. Rectal insufflation.
Treatment.	<ul style="list-style-type: none"> Artificial anus usually requires operative treatment by vivifying margins and suturing, or resection and suturing. Spontaneous closure of fistula. Use of actual cautery. Diet, rest, and compression. Vivifying margins and closing wound by buried and superficial sutures. Opening peritoneal cavity. Indications for use of Dupuytren's enterotome.

PERITONITIS.

Varieties.	<ul style="list-style-type: none"> Idiopathic.—Very rare; caused by localization in peritoneum of floating pus-microbes. Traumatic.—Infection from without through wound or from injury of internal organs. Plastic. <ul style="list-style-type: none"> Regeneration process—no tendency to suppuration. Process remains localized—no tendency to extension. Gives rise to firm adhesions; prognosis favorable.
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Peritonitis (continued). Varieties (continued).	Septic.	Inflammation caused by pus-microbes. Progressive in character. Often becomes diffuse, and causes death in less than forty-eight hours. Death results from septic intoxication. Peritoneum often but little changed in appearance. Most fatal forms caused by intestinal perforation and puerperal infections. Pulse always rapid and wiry. Temperature may be subnormal. Tongue dry. Vomiting and often diarrhœa. Almost always fatal. Treatment symptomatic. If laparotomy is made, copious flushing and drainage. Stimulants.	
		First described by Mikulicz. Numerous adhesions by masses of plastic lymph. Adhesions tend to limit extension of disease. If life is prolonged, may end in suppurative peritonitis.	
	Fibrino-plastic.	Etiology same as septic and fibrino-plastic forms. Septic intoxication less severe than in septic form; more localized than septic form. Pus-microbes and diminished absorptive capacity are the most important etiological elements. Pain more severe than in septic variety. Temperature as a rule increased. Differential diagnosis between obstruction and peritonitis. If perforation has taken place, gas in peritoneal cavity. Signs of fluid in peritoneal cavity. Exploratory puncture.	
		Suppurative.	
	Treatment.		Prophylactic.—Laxatives (Tait). Strictest antiseptic precautions; drainage when required. Indications for use of opiates. Laparotomy. { Flushing; suturing of perforations; drainage. { Opening of intraperitoneal abscess in two stages. { Diet and stimulants.

Peritonitis (continued).	Tubercular.	Ascites, circumscribed or diffuse. Peritoneum thickened and studded with tubercles. Circumscribed form usually occupies lowest part of abdomen; most frequent in females. Sometimes resembles ovarian cyst.	
Varieties (continued).		Fibrino-plastic.	{ No serum in peritoneal cavity. { Gelatinous fibrin, cementing surfaces together.
		Adhesive.	{ Masses of fibrin. { Slight adhesions, often causing intestinal obstruction. { Ulceration may lead to bimucous and fecal fistula.
		Diagnosis.	{ History of case. { Differential diagnosis between different forms of ascites. { Exploratory puncture.
		Treatment.	{ Laparotomy is indicated only when ascites is present. { In such cases drainage is essential. { Tapping and iodoform injections may prove useful.

DISEASES AND INJURIES OF THE LIVER, GALL-BLADDER, SPLEEN, AND PANCREAS.

Liver.	Hydatid cysts.	Frequency and location.	{ Liver more frequently affected than any other organ. { Cysts usually single, but may be multiple. { May implicate centre or surfaces of organ.
		Symptoms.	{ Painless swelling, occupying region of liver. { General health not much impaired. { Fremitus not a reliable sign. { Œdema of lower extremities from pressure on vena cava. { Evidences of suppurative inflammation in interior of cyst. { Exploratory puncture and microscopical examination for hooklets. { Exploratory incision preferred by König.
		Treatment.	{ Operation indicated as soon as probable diagnosis can be made. { Tapping and washing out suppurating cysts with antiseptic solution.

Liver (continued).	Hydatid cysts (continued).	Treatment (continued).	Operation in one stage.	Introduced by Lindemann. Incision over most prominent part of swelling. Incision and evacuation of cyst. Stitching of opening in cyst to parietal peritoneum. Insertion of tubular drain and dressing of wound. Prophylaxis against hemorrhage if cyst is covered by liver-substance.
			Operation in two stages.	First recommended by Volkmann. Safer than operation in one stage. Incision down to cyst and packing with iodoform gauze. Incision of cyst five days later. Removal of contents and drainage. Operation through chest for cysts of upper surface.
	Simple cysts, or dermoid cysts, call for same treatment as echinococcus cysts.			
	Tumors.	Varieties: carcinoma, sarcoma, gumma, lymphoma, adenoma, angioma. Operation justifiable only when tumor is benign and gives rise to symptoms. Successful removal of adenoma by Keen.		
	Abscess.	Usually result as a metastatic affection in peripheral suppuration and dysentery. Differential diagnosis between primary abscess and suppuration in hydatid cyst.		
		Symptoms.	History of case and general condition of patient. Chills and temperature. Pain in region of liver and shoulder. Swelling and fluctuation. Jaundice is rare.	
		Differential diagnosis.	Pleuritic and pulmonary symptoms of abscess reach diaphragm. Distention of gall-bladder. Carcinoma of gall-bladder, biliary ducts, or liver. Circumscribed perihepatitic abscess. Indications for and value of exploratory puncture.	
		Prognosis.	Pyemic abscess always fatal. Isolated, single abscess often amenable to surgical treatment.	
		Treatment.	Aspiration sometimes successful (strongly advocated by Hammond). Incision and drainage same as in echinococcus cysts.	

Liver (continued.)	Rupture.	Usually attended by other injuries. If life is sufficiently prolonged, laparotomy and direct treatment of visceral wound. Wound should be either sutured or packed with iodoform gauze.
	Wounds.	Many recoveries from bullet and stab wounds of this organ have been reported. Wounds of adjacent organs render prognosis more grave, but not hopeless. Laparotomy is indicated to arrest hemorrhage and treat visceral wound. Technique of suturing of wounds. In lacerated wounds iodoform-gauze tampons are indicated. Healing of wound and regeneration of lost tissue.
	Partial hepatectomy.	A number of successful operations have been reported. Lagenbuch removed greater part of left lobe successfully. Keen's operation for adenoma. Removal of diseased part can be done by knife, thermo-cautery, or elastic ligature. Operation not justifiable in malignant disease of liver.
	Floating liver.	Rarity of this affection. Swelling in abdomen caused by displaced organ. Liver dulness transferred in a downward direction. Treatment by appropriate external mechanical support. Operation to secure fixation of the organ might be attempted in proper cases.

SURGERY OF THE GALL-BLADDER AND BILIARY DUCT.

Biliary calculi.	Causes.	Sex—more frequent in women. Age—rare in infants and children. Tight lacing. Imprudent diet and lack of exercise. Disease of gall-bladder and bile-duct.
	Diagnosis.	Clinical history pointing to biliary colic. Circumscribed peritonitis in vicinity of gall-bladder. Distention of gall-bladder. Shape of calculi.—Faceting denotes multiplicity. Conditions giving rise to jaundice. Conditions giving rise to distention of gall-bladder.

Biliary calculi (continued).	Treatment.	<div>Medical.</div> <div>-</div> <div>Surgical.</div>	<div>Diet.</div> <div>Carlsbad salt.</div> <div>Phosphate of soda.</div> <div>Sweet oil.</div> <div>Removal of calculi by laparotomy.</div> <div>Removal of inflammatory product from gall-bladder.</div> <div>Removal of single calculus by taxis.</div>
Empyema and ascites.	<div>Almost always result from obstruction in cystic duct.</div> <div>Organ always enlarged; sometimes capacity increased to several pints.</div> <div>Differential diagnosis between enlarged gall-bladder and floating and hydro- or pyonephrotic kidney.</div> <div>Incision and drainage in two stages.</div>		
Cholecystotomy.	<div>Incision of gall-bladder for the relief of distention or removal of calculi.</div> <div>First done by Bobbs of Indianapolis in 1867.</div> <div>Established in 1878 by Marion Sims and Kocher.</div> <div>Ideal operation—removal of calculi and suturing of visceral wound.</div> <div>In one stage—removal of calculi and suturing of visceral wound to external wound.</div> <div>In two stages—fixation of gall-bladder in external wound; incision five days later.</div> <div>Removal of gall-stones from <div> <div>Gall-bladder.</div> <div>Cystic duct.</div> <div>Common duct by <div> <div>Forceps.</div> <div>Crushing.</div> <div>Incision of duct.</div> </div> </div> </div> </div>		
Cholecystectomy.	<div>Excision of gall-bladder, practised by Langenbuch in 1880.</div> <div>Indicated when common duct is closed and when gall-bladder is seat of malignant disease.</div> <div>Technique. <div> <div>External incision.</div> <div>Isolation of gall-bladder.</div> <div>Tying of duct.</div> </div> </div>		
Cholecyst-enterostomy.	<div>Formation of fistulous opening between gall-bladder and duodenum.</div> <div>Indicated in permanent closure of common duct.</div> <div>Technique. <div> <div>External incision.</div> <div>Incising of gall-bladder and duodenum.</div> <div>Union between two wounds by two rows of sutures.</div> </div> </div>		

SURGICAL AFFECTIONS OF THE PANCREAS.

Cysts.	{	Causes.	{	Trauma.
			Obliteration of duct of Wirsung.	
			Diminution or suspension of auto-absorption.	
			Pancreatic calculi.	
{	Symptoms.	{	Pancreatic indigestion.	
		Location and character of swelling.		
		Exploratory puncture.		
Abscess.	{	Treatment.	— Incision and drainage in one or two stages.	
			Difficulty of recognition during life.	
			Anterior incision and drainage.	
			Posterior incision and drainage.	
{	Thorough drainage.			
		Wounds.	{	If organ is prolapsed, injured part can be removed.
			If wound is detected during laparotomy for other indications, it should be treated by direct measures.	
Carcinoma.	{	Diagnosis cannot be made sufficiently early to warrant operative procedure.		
			Part of organ has been successfully removed by Billroth in a pylorotomy in which the disease had extended to other organs.	

SURGICAL AFFECTIONS OF THE SPLEEN.

Cysts.	{	Varieties: simple, dermoid, echinococcus.
		Diagnosis difficult.
		If spleen is displaced downward, cyst moves with organ.
Malignant tumors.	{	Treatment same as in cysts of pancreas.
		Rare, and not amenable to surgical treatment.
		May follow trauma or appear as metastatic formation.
Abscess.	{	Incision and drainage under strictest antiseptic precautions.
		If organ is not adherent, operate in two stages.
		Laparotomy should be done to arrest hemorrhage.
Rupture and wounds.	{	Hemorrhage should be arrested by suturing or antiseptic tampon.
		If these measures do not succeed, excision of organ becomes necessary.

Splenectomy.	Indications.	Wounds.
		Tumors.
	Importance of spleen as a blood-producing organ.	Cysts.
		Floating spleen.
	Mortality so far amounts to 80 per cent.	
Technique.		External incision through linea semilunaris.
		Separation of adhesions.
		Clamping and ligation of vessels at hilum.
		Closure of external wound.

DISEASES AND INJURIES OF THE RECTUM.

Surgical anatomy.	{	Relative position to other pelvic organs.
		Length of extraperitoneal part three to four inches.
		Arterial blood-supply from hemorrhoidal branch of inferior mesenteric.
		Ischio-rectal fossa on either side of rectum.
		Rectum in foetus part of uro-genital sinus.
Congenital malformations.	{	If separation from bladder does not take place, it empties into bladder, urethra, or vagina.
		Lower two inches of rectum formed from epiblast.
		If this involution fails to take place, imperforate anus results; if lower part of rectum does not descend, imperforate rectum results.
		Diagnosis. { Absence of fecal discharges.
		Escape of meconium through urethra or vagina.
		Digital and instrumental examination.
Pruritus ani.	{	Treatment. { In imperforate anus, incision and stitching of bowel to skin.
		In imperforate rectum, inguinal colostomy or operation by Kraske's method.
		Painful itching of anus.
		Neurotic form most obstinate to treat.
		Treatment. { If caused by thread-worms, remove them.
		Eczematous variety, skin affection must be treated.
		Marine lint dressing; hot and cold water.
		Local use of iodine and nitrate of silver.
		Stretching of sphincter in obstinate cases.

Hemorrhoids or varicose rectal veins.	Causes.	{ Erect posture (peculiar to man) and absence of valves in the pelvic veins; heredity; sedentary habits. Pregnancy; constipation; over-eating. Alcoholic excess; age—rare before puberty.
	Varieties.	{ External.—Venous, cutaneous. Internal.—Venous, columnar, nævoid.
	Symptoms.	{ Hemorrhage at stool. Pain during defecation. Protrusion of hemorrhoids and prolapse of rectum. Urinary disturbances.
	Treatment.	{ Palliative. { Regulation of bowels by diet and laxatives. Cleansing and reduction of prolapsed part. Active exercise and careful observation of diet. Local astringent and anodyne applications. Operative. { Preparation for operation. Overstretching of sphincter. Removal of swelling by ligation or clamp and cautery. Excision advised by Whitehead. Injection of carbolic acid.
Foreign bodies.	{ Most frequently met with in the insane. Fragments of bone on their way from stomach. Extraction with fingers or forceps.	
Impacted fæces.	{ Most frequent in elderly and hysterical. May be attended by diarrhœa. May produce intestinal obstruction. Mechanical removal, aided by hot-water injections.	
Prolapsus.	Varieties.	{ Prolapsus ani—descent and protrusion of mucous membrane. Prolapsus recti—descent of whole thickness of bowel.
	Causes.	{ Age—most frequent in children. Constipation; phimosis; stone in bladder; polypi. Hemorrhoids; enlarged prostate.

Prolapsus (continued).	Treatment.	<ul style="list-style-type: none"> Removal of cause. General tonics. Astringents. Mechanical support after reduction. Linear cauterization. <ul style="list-style-type: none"> Nitrate of silver. Nitric acid. Cautery. Rectal tube. V-shaped piece may be excised in bad cases. Excision of circular piece of mucous membrane (Treves). Reduction of prolapsus in bad cases.
Sphincterismus.		<ul style="list-style-type: none"> Spasm of sphincter, almost always caused by ulcer or fissure. Common in hysterical women, without local lesion. If caused by fissure, this must be treated. In hysterical form, nerve-tonics and forcible dilatation.
Wounds.	<ul style="list-style-type: none"> Causes. <ul style="list-style-type: none"> Unskilful use of syringe or bougie. Falling on sharp instruments. Parturition. Gunshot wounds. Treatment. <ul style="list-style-type: none"> Perineal operation as for stone. Treatment by free drainage and antiseptic solutions. 	
Fissure of anus or anal ulcer.	<ul style="list-style-type: none"> Symptoms. <ul style="list-style-type: none"> Linear ulcer at verge of anus. Ulceration exposes some of the sensitive nerves. Always accompanied by severe spasm of sphincter. Severe pain during and after defecation. Slight hemorrhages. In women pain is often referred to vagina or uterus. Ulcer usually occupies posterior border of anus. Treatment. <ul style="list-style-type: none"> In recent cases fissure may heal without operation. Use of mercurial ointments. Cauterization. Incision, passing through ulcer into sphincter. 	

Ischio-rectal abscess.	Varieties.	Acute.	Severe pain and marked general disturbance. Most common in middle-aged persons with impaired health. Swelling on one side of anus. May open into rectum or externally.
	Treatment.	Chronic. —	Usually tubercular, and results in tubercular or cold abscess. In acute form: early and free incision, incision from perineum, free drainage. In chronic form: incision, curetting, and iodoform-gauze tampon.

Marginal abscess. — Frequently terminates in formation of fistula.

Fistula in ano.	Sinus on one side of anus or rectum with one or two openings.		
	Varieties.	Complete.	Most common form. Anal or rectal and cutaneous openings. Internal opening usually within an inch of margin. Escape of gases and fæces common. External opening often multiple.
		Incomplete.	Blind internal. { Often presents symptoms of fissure. Recurring swelling about anus. Intermittent escape of pus. Use of speculum. Blind external.— Use of probe and peroxide of hydrogen in diagnosis.
	Symptoms and diagnosis.	History of case points to paraproctitis. Escape of gas and fæces through fistula. Digital exploration. Use of rectal speculum and probe.	
	Treatment.	Preparation for operation. Division of tissues between sinus and rectum with knife or cautery. Packing of wound with iodoform gauze. In tubercular form, removal of tubercular tissue with spoon or cautery. Incomplete fistulæ must be made complete. Elastic ligature only in exceptional cases.	

Syphilitic ulceration. { Appears usually near anus during first year after initial lesion.
Severer forms during later stages, due to gummata.
Inherited syphilis appears three or four months after birth.

Tubercular ulcers.	{ May occur as primary or secondary disease. Ulcers large, oval, with ragged, undermined edges. Long axis of ulcer parallel to long axis of bowel. Frequently results in perirectal abscess and fistula.	
	Symptoms.	{ Ulceration of rectum frequently mistaken for dysentery. Constant desire to go to stool. Scanty mucous discharge. Ulcer about anus more painful than when high up.
	Treatment.	{ Usually very unsatisfactory. Anodyne injections and topical applications of iodoform, combined with use of sharp spoon and cautery. In ulcers low down, division of sphincter.
Tumors.	Polypi.	{ Most frequent in children; hemorrhage a prominent symptom. Size—pea to cherry, usually pedunculated. If pedicle is long or tumor low down, it protrudes from anus during defecation; ligate pedicle and excise below.
	Villous growths.	{ Comparatively rare; may become malignant. Sessile or short pedicle. Lobulated—surface velvety. Symptoms analogous to those of polypi. Treatment—complete removal.
	{ Sarcoma—very rare. Cylindrical epithelioma. Surface epithelioma. Submucous or glandular epithelioma.	
	Carcinoma.	{ Symptoms. { Disease of middle and advanced life; pain and tenesmus. Discharge of mucus and blood; stenosis of rectum. Intestinal obstruction; ulceration into adjacent organs. Formation of external fistula.
		{ Differential diagnosis.—Other tumors; non-malignant stricture.
	Treatment.	{ Proctotomy. Proctectomy. Inguinal colostomy.

Proctectomy.	In carcinoma involving anus, ordinary operation by excision. Kraske's operation for carcinoma within reach of finger and when disease does not involve pararectal tissue.	
	Technique of Kraske's operation.	<ul style="list-style-type: none"> Preparation of patient. Ventral recumbent position—pelvis elevated. External incision. Removal of coccyx. Removal with chisel of left half of lower sacral vertebræ. Isolation of bowel. Resection, with or without circular suturing. Tamponing external wound. Temporary resection of sacrum.
Non-malignant stricture.	Varieties: annular, tubular.	
	Symptoms and diagnosis.	<ul style="list-style-type: none"> History of former ulceration. Diarrhœa attended with constipation. Mucous discharges. Tenesmus. Abscess and fistulæ. Digital and instrumental exploration. Ballooning of rectum below stricture (Bryant).
	Treatment.	<ul style="list-style-type: none"> Gradual dilatation. Division of stricture, when low down. Proctotomy, linear section through stricture to coccyx.

HERNIA.

Definitions.	Protrusion of any viscus from its normal cavity through normal or artificial openings in the surrounding structures.	
	The term used alone signifies protrusion of abdominal contents through abdominal parietes.	
	Enterocœle.—Hernia containing intestine.	
	Epiplocele.—Hernia containing omentum.	
	Entero-epiplocele.—Hernia containing intestine and omentum.	
	Congenital hernia.—Hernial sac containing testicle.	
	Acquired hernia.—Testicle supplied with a proper tunica vaginalis; sac containing abdominal contents.	

Hernial sac.	{ Body. Neck. Mouth.
Etiology of herniæ.	{ Sex—more common in males. Age—children and adults. Heredity in 34 per cent. (Kingdon). Occupation. Pregnancy. Obesity. Pulmonary affections.
Seat of herniæ.	{ Inguinal, 84 per cent. Femoral, 10 per cent. Umbilical, 5 per cent. Diaphragmatic. Obturator, etc.
Diagnosis.	{ Swelling, increased by erect position and by coughing, lifting, etc. Reduction by taxis. Swelling increases in size when intra-abdominal tension is increased, which also produces "impulse." Percussion elicits tympany if hernia contains intestine, and dulness if it contains omentum.
Prognosis.	{ Favorable if hernia can be reduced and patient can wear truss. Danger arising from strangulation. Size of hernia. Irreducible omental hernia liable to give rise to strangulation.
Palliative treatment.	{ Wearing properly-fitting truss. In infants use skein of Berlin wool in place of truss. Directions for wearing truss. Directions for fitting truss. Varieties of trusses. Measurements to be taken in ordering trusses.

Radical cure.	{ Subcutaneous methods now nearly obsolete. Injections of alcohol (Schwalbe's method).		
	Operation.	Indications.	{ Size and location of hernia. Age of patient. Occupation. Irreducible hernia.
		{ Preparation; external incision; isolation of sac. Reduction of contents; excision of adherent omentum. Ligation of neck of sac; closure of canal. Suturing of external wound.	
		{ Excision of sac after ligation. Closure of femoral canal with flap from pectineus muscle.	
Femoral hernia.			{ Closure of opening by suturing, with or without excision of sac; in latter case it is used as a plug.
Umbilical hernia.			{ Treatment of above in children.
Radical cure of congenital hernia.			{ Isolation and transverse section of sac. Lower part used for covering for testicle. Ligation of proximal part at internal ring followed by excision. Closure of inguinal canal by sutures.
McEwen's operation.			{ Sac not excised, but used as a pad over internal ring. Suturing of conjoined tendon by double ligature to Poupart's ligament.
Ball's method.			{ Isolation of sac. Torsion and twisting before suturing and cutting off sac.
Barker's operation.			{ Isolation and tying neck of sac; section of sac below ligature. Fixation of neck of sac to abdominal wall by ligatures, which closes internal abdominal ring. Closure of canal by several sutures.
McBurney's operation.			{ Ligation of neck of sac; removal of sac. Suturing of skin to deep fascia. Packing wound with iodoform gauze. Healing of wound by granulation.
Halsted's operation.			{ Incision laying open entire inguinal canal. Suturing of sac at and above internal ring with quilted sutures. Excision of remaining part of sac. Transplantation of cord to outer angle of wound; suturing of canal with quilted sutures.

- Bassini's operation. { Twisting and ligation of neck of sac.
Excision of sac.
Transplantation of cord to upper angle of wound.
Suturing of border of rectus, internal oblique, transversalis, and transversalis fascia, *underneath* cord to Poupart's ligament.
Suturing of external oblique *over* cord to Poupart's ligament.
Closure of external wound in usual manner.
- Kocher's operation. { External incision in line of inguinal canal beyond internal ring.
Isolation and twisting of sac, as advised by Heliiodorus.
Bring twisted sac through puncture made with forceps over internal ring.
Inclusion of twisted sac in sutures used to close wounds.

ANATOMICO-PATHOLOGICAL VARIETIES OF HERNIÆ.

- Cæcal hernia. { Hernia containing cæcum.
Always found on right side.
Large size—usually irreducible.
Usually has only a partial sac covering it.
In front of it may be a hernial sac containing small intestines.
Rarely becomes strangulated.
- Irreducible hernia. { So called when hernia cannot be reduced, and symptoms of strangulation are absent.
Usually of long standing and large size.
Omentum always present and adherent.
Irreducibility due to adhesions of protruding omentum.
Treatment. { Radical operation for hernia.
Incision.
Opening of sac.
Separation of adhesions.
Reduction or ligation of omentum in small sections, and excision.
Removal of testicle in exceptional cases.
Treatment by diet and rest.
Wearing of truss with large concave pad if operation is refused.

Incarcerated hernia.	{ Irreducible hernia attended by symptoms of obstruction. Most common in umbilical hernia. No symptoms of acute strangulation. Impulse on coughing well marked. Taxis and local application of ice. Copious enemata and absolute rest and diet.
Inflamed hernia.	{ Caused by violence or badly-fitting truss. Heat, redness, pain, tenderness, swelling. Local and general temperature. Local peritonitis. Is usually irreducible.
	{ Treatment. { Rest in recumbent position. Local application of ice. Internal use of opium. Incision, if suppuration takes place.
Strangulated hernia.	{ A hernia constricted at its neck, so that reduction is difficult or impossible, the constriction at the same time producing symptoms of obstruction and endangering the circulation in the protruded bowel.
Mechanism of strangulation.	{ Sudden descent of a knuckle of bowel or an additional knuckle. Venous congestion. Œdema.
Seat of stricture.	{ At opening through which hernia has descended. In neck of hernial sac. In sac itself by bands of adhesions. Volvulus of intestinal loop in sac.
Changes resulting from strangulation.	{ Venous congestion; œdema; color of strangulated loop. Effusion of serum into sac. Gangrene of strangulated loop. Appearance of strangulated omentum. Inflammation in the interior of sac. Procedures to test vitality of strangulated loop.—Color; peristalsis; puncture. Gangrene. { From pressure at point of constriction. { From obstruction to venous circulation. Suppuration rare.

Strangulated hernia (continued).	Symptoms.	<ul style="list-style-type: none"> Sudden and complete constipation; persistent vomiting. Intermittent pain in region of umbilicus. Fecal vomiting; pain at seat of hernia. Hernial swelling tense; absence of "impulse." Shock an early symptom in some cases. Diffuse peritonitis indicates gangrene and perforation. Local symptoms sometimes obscure or absent.
	Differential diagnosis.	<ul style="list-style-type: none"> Incarcerated hernia—obstruction not complete. Inflamed hernia—evidence of local inflammation. Intestinal obstruction from other causes. Inflammatory swellings at the usual sites of hernia.
	Prognosis.	<ul style="list-style-type: none"> Intensity of early symptoms. Time intervening between strangulation and treatment. Reduction should be accomplished as soon as possible.
	Treatment.	<ul style="list-style-type: none"> Reduction of a hernia by manipulation with the fingers and pressure; in recent cases anesthetics superfluous. Position of patient. <ul style="list-style-type: none"> In femoral hernia, pressure at first downward. In inguinal hernia, upward and outward. Taxis. <ul style="list-style-type: none"> The part protruded last should be reduced first. Traction on sac often more efficient than pressure. Excessive force should be carefully avoided. Taxis should not be prolonged more than fifteen minutes. Taxis is contraindicated in gangrene of the bowel. Taxis is contraindicated in strangulated irreducible hernia. Application of cold.—Ice-bag; ether spray. Copious enemata; opium to limit peristaltic action. Rest and application of truss in after-treatment.
Strangulation after reduction.	If symptoms of obstruction are not relieved by reduction, suspect:	
	Existence of either	<ul style="list-style-type: none"> Return of injured or gangrenous bowel. Peritonitis. Second strangulated hernia. Reduction of hernia <i>en masse</i>.
	All of these conditions make a laparotomy necessary.	

Herniotomy.	<ul style="list-style-type: none"> Indications. { When taxis fails. { When gangrene of strangulated loop is suspected. Preparations for operation should be made before taxis under anesthesia is commenced. External incision should be ample—three to six inches. Dissection should be made between two dissecting forceps. Identification of sac. Sac should always be opened. Constriction should be relieved by cutting or stretching. Examination of protruded bowel and omentum. Omentum as a rule should be tied in small sections and cut off. If bowel can be safely returned, ordinary operation for radical cure should be done. After-treatment.
Gangrene of intestine.	<ul style="list-style-type: none"> Positive evidences of gangrene. { Perforation. { Color or consistence of bowel. { Gas or feces in sac. Treatment. { Resection and circular enterorrhaphy and return of gut. { Resection and suturing and return and fixation of gut in abdominal incision (Hahn). { Removing constriction, opening of bowel, and fixation in wound. { Fixation of gut in wound, abdominal section, and entire anastomosis (Helferich).
Remote consequences following reduction of strangulated hernia.	<ul style="list-style-type: none"> Intestinal obstruction from bands of adhesions. Intestinal obstruction from displaced hernial sac. Intestinal obstruction from cicatricial stenosis (Garré).

SPECIAL FORMS OF HERNIA.

Littré's hernia.	<ul style="list-style-type: none"> First described by Littré. Strangulation of only a part of circumference of bowel. Most frequent at femoral ring. Symptoms not as severe as when entire bowel is strangulated. Obstruction as a rule incomplete; swelling difficult to detect.
Strangulated omental hernia.	<ul style="list-style-type: none"> Symptoms of strangulation not as severe as when bowel is strangulated. Obstruction and pain not so marked. Great resemblance to Littré's hernia. If tissues overlying sac are thin, hernia can be felt.

Inguinal hernia.	Acquired forms.	Oblique.—Hernia following spermatic cord from internal to external ring.	
		Direct. { Hernia passing directly through abdominal wall to external ring, pushing before it the conjoined tendon. It is internal to epigastric artery.	
	Congenital.	Obliteration of tubular process after descent of testicle. If this obliteration fails to take place, hernia results. Sac of hernia is the tunica vaginalis.	
		If tubular process closes on both sides, but not in the middle, hydrocele of the cord results.	
	Infantile or encysted hernia.	{ Results if proximal end of tubular process closes, and, later, peritoneum is pushed down by a hernia into tunica vaginalis. If septum ruptures, same conditions as in congenital hernia develops.	
Hernia into funicular process.	{ Develops when tubular process closes below and not above. Testicle is surrounded by a normal tunica vaginalis.		
Differential diagnosis between congenital and acquired inguinal hernia.		{ Congenital hernia appears at or soon after birth, and intestine is in contact with testicle. Acquired form comes on slowly in adult life, and testicle can be felt below hernial sac.	
Differential diagnosis between inguinal hernia and		{ Hydrocele of tunica vaginalis or cord. Congenital hydrocele. Hematocele. Varicocele. Undescended testicle.	
Femoral hernia.	{ Protrusion of bowel through femoral ring underneath Poupart's ligament. Description of femoral canal. Hernia always acquired, never congenital. Direction of hernia from Poupart's ligament down to saphenous opening. Coverings: skin, superficial fascia, sheath of vessels, septum crurale, and peritoneum. Relation of obturator artery to femoral hernia. Much more common in females. Hernia usually of small size. Omentum never in large quantities.		
	Differential diagnosis.	{ Under Poupart's ligament. Can be pushed to the outside of spine of pubes. Swelling usually small, round, and tense. Psoas abscess; fatty tumor; varix of saphenous vein. Enlarged lymphatic glands; cysts in femoral canal.	

Femoral hernia (continued).	Treatment.	Difficulty in retaining hernia by truss.
		Taxis. { Position of patient. Direction of patient.
Umbilical hernia.	Congenital.	External incision parallel to long axis of swelling.
		Careful dissection of deeper layers.
	Herniotomy.	Opening of sac.
		Cutting of Gimbernat's ligament.
	Infantile.	Examination and reduction of bowel.
		Radical operation if bowel is returned.
	Adult.	Closure and dressing of wound.
		Covering of sac exceedingly thin.
	Hernia often of large size.	Cork pad held in place with adhesive plaster.
		Swelling small in size.
Ventral hernia.	Cork plaster and adhesive strips.	Occurs most frequently in obese women.
		Swelling often of large size.
	Omentum almost always present in sac.	Truss or belt.
		When strangulation takes place and taxis fails, early operation is necessary.
Lumbar hernia.	Skin overlying sac exceedingly thin.	Removal of sac and closure of opening by superficial and buried sutures.
		Hernia in regions not the usual sites of hernia.
	Scars following laparotomy.	Stab wounds of abdomen.
		Pregnancy.
	Retention of hernia by belt or truss.	Very rare.
		Protrusion through a triangle bounded by external oblique, latissimus dorsi, and crest of ilium.
Lumbar hernia.	May follow a trauma.	Never attains large size.
		May become strangulated.
	Has frequently been mistaken for tumor.	Well-fitting abdominal belt.

Perineal hernia.	{ More frequent in females. Hernia descends in front of rectum, and escapes between fibres of levator ani. Is always reducible.
Ischiatic hernia.	{ Protrusion of intestine through great sacro-sciatic foramen. Covered in whole or part by gluteus maximus muscle. It is one of the rarest forms of hernia, and easily overlooked.
Obturator hernia.	{ Intestine escapes through obturator foramen. Rarely recognized during life. If strangulated, swelling at upper and inner part of thigh and pain along obturator nerve. Reduction should be accomplished by abdominal section.
Diaphragmatic hernia.	{ Congenital. { Contains most frequently the stomach. { Almost always on left side. { Traumatic. { Most frequently on left side. { Stomach most frequently displaced.
Hernia into the foramen of Winslow.	{ Gives rise to intestinal obstruction. Can be reached only by abdominal section.
Properitoneal hernia.	{ First described by Krönlein. May lie between parietal peritoneum and muscles, between the planes of abdominal muscles or outside of them. As a rule, such a hernia is primarily inguinal and congenital, and associated with undescended testicle. Location, above Poupart's ligament. Taxis never certain; herniotomy necessary.
Retro-peritoneal hernia.	{ Mesenteric hernia of Cooper. Lodgement of the small intestines in the fossa duodeno-jejunalis. Manifests itself in the production of intestinal obstruction. The only treatment is by laparotomy.

GENITO-URINARY SURGERY.

Surgical anatomy of kidney and ureters.	{ Anatomical location; relations to peritoneum and colon; paranephritic fat. Length of ureters, 14½-16 inches. Calibre corresponds to a goosequill; narrowest part near their termination. Anomalous location of kidney and variation in size. Description of horseshoe kidney.
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Floating and movable kidney.	<div> <div> <div>Floating kidney has a long and narrow meso-nephron.</div> <div>Movable kidney remains extraperitoneal.</div> <div>Causes of displacement either congenital or acquired.</div> <div>Most frequently met with in females and on right side.</div> </div> <div> <div>Symptoms and diagnosis.</div> <div> <div>Pain in lumbar, right hypochondriac, or umbilical region.</div> <div>Suffering diminished by rest and recumbent position.</div> <div>Movable swelling below normal location of kidney.</div> <div>Swelling can be felt most distinctly in erect or semi-recumbent position.</div> <div>Differential diagnosis between enlarged gall-bladder and floating kidney.</div> </div> </div> <div> <div>Treatment.</div> <div> <div>Compress and elastic bandage; position of patient.</div> <div>Nephrorrhaphy.</div> <div> <div>External incision.</div> <div> <div>Vertical.</div> <div>Below and parallel to last rib.</div> </div> </div> <div>Cleaning away perinephritic fat.</div> <div>Anchoring kidney by four sutures, including capsule and some of the parenchyma and fascia and muscle.</div> <div>Scarifying of exposed part of capsule.</div> <div>Incision of capsule and suturing (Tuffier).</div> <div>Tamponing wound with iodoform gauze for five days.</div> <div>Ultimate and immediate results.</div> </div> </div> </div>
Nephralgia.	<div> <div>Hyperacidity of urine, if prolonged, may give rise to nephralgia; consists in deep-seated unilateral lumbar pain extending along ureter.</div> <div>Absence of symptoms pointing to pyelitis.</div> <div>Indications: internal use of alkalies and careful diet.</div> </div>
Phosphatic urine.	<div> <div>Hyperalkalinity of urine; most common in nervous, overworked persons of feeble digestion.</div> <div>Attended by headache, lassitude, and depression of spirits.</div> <div>Sexual hypochondriasis a frequent concomitant.</div> <div>Dilute mineral acids, strychnia, regulation of diet, active exercise.</div> </div>
Oxaluria.	<div> <div>Often the unsuspected cause of a variety of genito-urinary symptoms.</div> <div>Causes: over-indulgence in food, alcoholic, and sexual excesses.</div> <div>Ill-defined lumbar or hypogastric pains, mental depression, call for examination of urine.</div> <div>The microscope reveals dumb-bell crystals.</div> <div>Mineral acids, bitter tonics, change of air and occupation.</div> </div>

- Gravel. { Deposition of crystalline substances in urinary passages.
 Caused by too great concentration of urine, resulting from errors in diet and lack of exercise.
 Deposits composed of uric acid, urates, or oxalate of lime.
 Symptoms same as in hyperacidity of urine.
 Frequent micturition and ardor urinæ most prominent symptoms.
 Medical and dietetic treatment.
- Renal calculus. { Formation of crystalline particles and cement substances from mucus and blood.
 Most frequently consists of uric acid, next in frequency oxalate of lime, and, lastly, carbonate of lime or mixed phosphates.
 Produced either in tubules or in one of the calyces.
 Single or multiple; as many as one hundred or more may be found in one kidney.
 In its passage through ureter causes nephritic colic.
 Violent pain in lumbar or hypochondriac region, extending along ureter to end of penis.
 Spasm of cremaster causes retraction of testicle.
 Relief sought by bending forward.
 Vesical tenesmus, faintness, and cold sweating frequent symptoms.
 Onset sudden, as well as relief when stone reaches bladder.
 Recurring attacks of pain last from few minutes to half hour or more.
 Partial or complete suppression of urine and hematuria.
 Febrile disturbances.
 Hypodermatic use of morphia and atropine, warm baths, and diluent drinks.
 In severe cases inhalations of chloroform under personal supervision of attending physician.
 If calculus becomes impacted, hydronephrosis or pyonephrosis results.
 Stone may ulcerate through ureter and produce lumbar or pelvic abscess.
- Differential diagnosis. { Tubercular pyelitis; tubercular spondylitis.
 Nephralgia; lithiasis; oxaluria; hydronephrosis.
 Pyonephrosis; lumbago.
- Ureterotomy or uretero-lithotomy. { Removal of calculus from ureter.
 Location of stone indicated by localized area of tenderness.
 Obstruction to escape of urine reduces its quantity.
 Vaginal and rectal examination important diagnostic resources.
 Abdominal section justifiable in grave cases.
 Extraction even in such an event by extraperitoneal route.

Renal calculus (continued).	Ureterotomy or ureterolithotomy (continued).	Impaction in upper part of ureter can be reached by incision reaching from below last rib to middle of Poupart's ligament. Ureter is lifted with peritoneum, and is easily found. In pelvic portion in female can be reached through vagina. In male by incision through posterior aspect of pelvis by Kraske's method.	
	Symptoms of stone in kidney.	Lumbar pains aggravated by exertion, and extending along ureter and cord to testicle and thigh. Vesical irritation. Hematuria. Pyuria. Exploration of pelvis of kidney with exploring needle.	
	Nephro-lithotomy.	Removal of stone from pelvis of kidney. Indications and contraindications for this operation. Preparatory treatment; position of patient. Oblique or vertical incision; digital palpation of kidney and pelvis. Akidopeurastis—needle-puncture. Incision of kidney with knife or Paquelin cautery. Extraction of stone; irrigation of pelvis of kidney; drainage. Packing of wound with iodoform gauze.	
		Removal of kidney; indications and contraindications. As a rule if any parenchyma is left, this operation should be preceded by nephrotomy. Indicated for malignant disease if limited to kidney. Partial nephrectomy and its indications.	
	Nephrectomy.	Lumbar operation.	External incision (Simon, König, Bardenheuer). Isolation of kidney, ligation of ureter, and disinfection of stump. Ligation of renal vessels; use of pressure forceps. Iodoform gauze tampon.
		Technique.	Indicated when organ is very large. Affords opportunity to examine opposite kidney. Incision through linea alba; incision through linea semilunaris. Incision of posterior parietal peritoneum. Isolation of kidney. Tying of ureters and vessels as above. Lumbar drainage. Suturing of peritoneal incision; closure of external wound.

INFLAMMATORY AND SUPPURATIVE AFFECTIONS OF KIDNEYS.

Interstitial nephritis.	<ul style="list-style-type: none"> Infection from antecedent affections lower down, with or without obstruction; frequently follows instrumentation. Chill, fever, and prostration; lumbar pain. If affection is isolated, amount of albumen is small. Usually affects both kidneys, and may prove speedily fatal. Formation of multiple abscesses.
Pyonephrosis.	<ul style="list-style-type: none"> Accumulation of pus in pelvis of kidney. Parenchyma may be almost completely destroyed by pressure. Swelling most prominent in ileo-costal region. Palpation of swelling. Inflation of colon as a diagnostic resource. Caused by pyelonephritis, usually attended by obstruction.
Differential diagnosis.	<ul style="list-style-type: none"> Enlarged gall-bladder. Hydronephrosis. Malignant tumor. Echinococcus cyst.
Treatment.	<ul style="list-style-type: none"> Lumbar nephrotomy. Lumbar nephrectomy. <ul style="list-style-type: none"> If nephrotomy fails. If kidney substance is almost completely destroyed. If opposite kidney is healthy.
Hydronephrosis.	<ul style="list-style-type: none"> Distention of pelvis of kidney by urine. In acquired form always the result of obstruction. In one-third of the cases it appears as a congenital affection. Causes of obstruction. <ul style="list-style-type: none"> Flexion or torsion of ureter. Cicatricial stenosis. Impaction of stone in ureter—40 per cent. of acute cases. Malignant disease of pelvic organs. In 15 per cent. of cases both kidneys are affected.

Hydronephrosis (continued).	Symptoms and diagnosis.	<ul style="list-style-type: none"> In simple cases symptoms are obscure. Swelling. Frequent micturition important symptom in children. Uremic intoxication. Insufflation of colon. Variation in size of swelling. Exploratory puncture.
	Differential diagnosis.	<ul style="list-style-type: none"> Enlarged gall-bladder. Ovarian tumor. Pyonephrosis. Malignant disease. Echinococcus cyst. Paranephritic abscess. Lumbar abscess.
	Prognosis.	<ul style="list-style-type: none"> Primary cause. Simultaneous affection of opposite kidney.
	Treatment.	<ul style="list-style-type: none"> Aspiration. Nephrotomy and removal of obstruction: stone, stricture, tumor. Drainage. Nephrectomy if nephrotomy fails and opposite kidney is healthy.
Perinephritis.	Definition: inflammation of	pararenal fat and connective tissue.
	Etiology.	<ul style="list-style-type: none"> Age—seldom found in children. Extension of suppurative inflammation from kidney or other adjacent organs. Trauma; metastatic infection.
	Symptoms and diagnosis.	<ul style="list-style-type: none"> Localized pain and tenderness. Fixation of spine and flexion of thigh. Fever.
	Treatment.	<ul style="list-style-type: none"> Rest in recumbent position. Hot fomentations, laxatives, and anodynes. Incision and drainage as soon as perinephritic abscess has been found.

Perinephritic abscess.	Symptoms.	<ul style="list-style-type: none"> Chills and fever. If product of inflammation is putrefactive, symptoms of sapremia. In some cases constitutional symptoms are slight. Deep-seated paroxysmal lumbar pain, extending downward. Tenderness on bimanual pressure. Bulging in lumbar region. Flexion of thigh and inclination of body toward affected side. Swelling presents fluctuation. Edema of leg and lumbar region.
	Diagnosis.	<ul style="list-style-type: none"> Exploratory puncture. Renal calculus. Lumbago. Tubercular spondylitis and coxitis. Appendicitis.
	Treatment.	<ul style="list-style-type: none"> Lumbar incision and drainage. Examination of the kidney. Nephrotomy if pelvis of kidney is diseased.
Tuberculosis of kidney.	Etiology.	<ul style="list-style-type: none"> Primary localization of bacilli in pelvis of kidney. Extension of tubercular disease from lower portion of urinary tract. Heredity.
	Symptoms and diagnosis.	<ul style="list-style-type: none"> Vesical irritation. Clinical symptoms of pyelonephritis, <i>plus</i> evidences of tubercular disease. Kidney may not be enlarged. Microscopical and bacteriological examination of urine.
	Prognosis.	— Always unfavorable.
	Treatment.	<ul style="list-style-type: none"> In advanced cases palliative only. In primary cases nephrotomy. Nephrectomy justified only when opposite kidney is healthy.
Cysts.	Varieties.	<ul style="list-style-type: none"> Congenital—often of large size. Acquired—in adults often multiple.
	Clinical history.	<ul style="list-style-type: none"> Swelling in region of kidney extending toward groin. Function of kidneys. Hemorrhage into cyst.

Cysts (continued).	Diagnosis.	{ Always difficult. Value of exploratory puncture and examination of contents.
	Prognosis.	{ Size of swelling. Hemorrhage into cyst.
	Treatment.	{ Frequent tapping will often effect a cure. Incision and drainage of cyst. Nephrectomy only in exceptional cases.
Hydatid cysts.	Clinical facts.	{ More frequent in kidney than any other organ, except liver and lungs. Sometimes secondary to disease in other organs. Symptoms same as those of cysts from other causes.
		{ Discharge of contents through urinary passages. This happened in fifty-two out of fifty-three cases collected by Roberts.
	Diagnosis.	— Only positive when hooklets are found in urine or fluid removed by aspiration.
	Treatment.	— Incision and removal through lumbar region, followed by drainage.
Solid tumors.	Varieties.	{ Adenoma (very rare). Papilloma (in pelvis of kidney). Carcinoma (most frequent in adults). Sarcoma (most frequent in children).
		{ Israel's method of palpation.
	Symptoms.	{ Swelling; hematuria. Examination of urine for fragments of tumor.
	Treatment.	{ Partial nephrectomy for non-malignant tumors. Indications for nephrectomy; contraindications to nephrectomy.
Injuries (sub-parietal).	Symptoms.	{ Lumbar pain and tenderness, pain relating to groin, testicle, and thigh. Frequent urination; hematuria; shock.
		{ Favorable in contusion and slight laceration.
	Prognosis.	{ Hemorrhage and collapse; uræmia if opposite kidney is diseased. Peritonitis.
		{ Absolute rest; limitation of diet. Gallic acid, ergot, and opium. Fixation of organ by external support. Removal of blood-clots from bladder. Median urethrotomy for removal of blood-clots and to secure rest for bladder. Lumbar nephrectomy or tamponade.

Wounds and injuries (penetrating).	Varieties.	{ Extraperitoneal. Intraperitoneal.
	Diagnosis.	{ Digital exploration. Hematuria. Perinephritic abscess as a complication. Peritonitis and presence of blood in peritoneal cavity.
	Prognosis.	{ Favorable in extraperitoneal variety. Unfavorable when peritoneal cavity is implicated.
	Treatment.	{ Extraperitoneal variety—rest, limited diet, ergot, and opium. Arrest of hemorrhage by antiseptic tampon. Drainage. Intraperitoneal variety—abdominal nephrectomy.
Wounds of the ureters.	Etiology.	{ Rare as an isolated injury. Inflicted during abdominal operations.
	Treatment.	{ Fixation of proximal end to surface of loin or vagina. Implantation into rectum (Reed). Lateral implantation and invagination.
Stricture of ureter.	Etiological varieties.	{ Pressure from without by tumors. Cicatricial contraction following a trauma or passage of calculus. Congenital stenosis.
	Treatment.	{ Gradual dilatation after nephrotomy. Ureteroplasty, according to Heineke-Mikulicz (Fenger). Nephrectomy when kidney on affected side is nearly destroyed and opposite one is healthy.

DISEASES AND INJURIES OF THE BLADDER.

Congenital deform- ities.	{ Bladder may be absent, when ureters empty into urethra, rectum, or vagina, or upon surface of body.	
	{ This condition usually attended by other defects in development.	
	{ Supernumerary bladders very rare congenital deformity.	
	{ Exstrophy of the bladder most frequent congenital defect.	

Exstrophy of the bladder.	{	Most frequent in males—80–90 per cent.
		Lateral portion of urogenital cleft defective.
		Pubic symphysis is absent.
		Opening in bladder always in the median line through which posterior wall protrudes.
		Epispadias, in the male, always attends this condition.
		Prostate gland rudimentary.
		Usually double oblique inguinal hernia is present.
		Cystitis from exposure of mucous membrane.
		General health often impaired by the consequences incident to this defect.
		Treatment. {
		Mechanical appliances to collect urine and protect exposed part of bladder.
		Wood's operation: flap from above covered by two lateral flaps.
		Maury's modification of Roux's operation: flap from scrotum and groin covered by two flaps from above and sides.
		Thiersch's operation.

GENERAL CONSIDERATIONS IN THE DIAGNOSIS OF GENITO-URINARY DISEASE.

Pain.	{	Location and time at which it is felt.
		Vesical calculus causes pain under surface of penis to short distance back of meatus.
		Renal affections give rise to pain in groin, down thigh, or in testicle.
		Disease of testicle causes pain in direction of inguinal canal.
		Pain distant from seat of disease, of reflex nature.
		In urethritis, prostatitis, and cystitis the affected organ is always the seat of pain; cystitis, prostatitis, urethritis, and passage of calculi are attended by pain during urination.
		Retention of urine and cystitis—pain relieved by emptying of bladder.
		In vesical calculus and acute prostatitis pain is increased at end of micturition; in prostatitis pain is increased during defecation.
		In vesical calculus pain is increased by exercise and relieved by rest.
		Irritability of sensory nerves of bladder a cause of frequent micturition.
Frequency of micturition.	{	This is observed in phimosis, contracted meatus, stricture, and inflammatory affections.
		Spinal irritation produces same result as in sexual excess and spinal concussion.
		Abnormal secretion of urine and small bladder other causes.
		Hypertrophy of prostate a frequent cause.

Frequency of micturition (continued).	{ Hysteria is a cause of frequent micturition. If exercise causes increased frequency of urination, stone or tumor of the bladder should be suspected. If rest produces same result, atony of the bladder or enlarged prostate should be suspected. If stream is small, it suggests stricture, contracted meatus, or inflammatory swelling. If force of stream is diminished, search for obstruction or atony of bladder. Prolongation of act suggests obstruction or atony of bladder.		
Hematuria.	{ Its existence indicates a solution of continuity in some portion of urinary tract. In renal hemorrhage of pathological origin there are other evidences of disease of that organ. In this form of hematuria blood is intimately mixed with urine. In profuse hemorrhage cylindrical ureteral clots will often be voided; bleeding from ureters usually associated with passage of renal stones; non-traumatic hemorrhage from prostate indicates tuberculosis or carcinoma. Hemorrhage from urethra usually depends on instrumentation. In urethral and prostatic hemorrhage blood is discharged in clots. Hemorrhage from bladder must be suspected if any of above causes can be excluded; most frequent causes of hemorrhage from bladder are stone, tuberculosis, carcinoma, and papilloma. Administration of cantharides and turpentine often causes hematuria. General diseases causing hemorrhage from bladder. { Purpura. Scurvy. Exanthemata. Bilharzia.		
Treatment of hematuria.	{ Removal of cause. In aseptic bladder clots are disorganized and discharged in shreds; if urine is ammoniacal, clots should be washed out with antiseptic solutions; large catheter or Bigelow's evacuating tube should be used for this purpose. If bladder cannot be emptied in this manner, cystotomy should be performed. Suprapubic operation should receive the preference.		
Retention of urine.	{ Causes. { Obstructive. { Stricture: spasmodic, organic. Hypertrophy of prostate. Acute prostatitis. Impacted calculus. Tumor of urethra or bladder. Congenital atresia of urethra. Pressure by tumors or gravid uterus; fecal impaction.		

Retention of urine (continued).	Causes (continued).	Defective expulsive force.	<ul style="list-style-type: none"> Paralysis. Shock and muscular debility. Atony of bladder from over-distention. Toxic action of drugs.—Belladonna; opium; cantharides.
	Symptoms.	<ul style="list-style-type: none"> Hypogastric swelling in median line. Elongation of urethra. Frequent desire to empty bladder. Toxemia, rigors, fever, feeble circulation, and suppression of urine. Dribbling of urine from overflow. In chronic form symptoms are usually very obscure. 	
	Treatment.	<ul style="list-style-type: none"> Catheterization. Warm baths and enemata. Aspiration of bladder.—Suprapubic; perineal; rectal. Of these routes, the suprapubic is safest and best. 	
	Penetrating wounds.	<ul style="list-style-type: none"> Puncture through the hypogastrium. Puncture through the vagina. Puncture through the rectum. Puncture through the sacro-sciatic foramen. Puncture by fragment in fracture of pelvis. 	
	Rupture of bladder.	<ul style="list-style-type: none"> Distention of organ. External force. Textural changes of bladder. Rupture usually in posterior wall, or at weakest point. 	
Injuries of the bladder.	Symptoms and diagnosis.	<ul style="list-style-type: none"> History of case. Inability to micturate. Use of catheter, followed by escape of small quantity of blood. Injection of filtered air does not distend organ. If rupture is extraperitoneal, injection of air causes emphysema. 	
		<ul style="list-style-type: none"> Extraperitoneal. Intraperitoneal. 	<ul style="list-style-type: none"> Escape of urine into proovesical, vesico-rectal, or vesico-uterine space; phlegmonous inflammation in these localities a source of danger. Symptoms may be delayed for a day or two. Catheter may enter peritoneal cavity, and can be freely moved, but no urine escapes. Unless promptly treated, patient succumbs to peritonitis.
	Varieties.		

Injuries of the bladder (continued).	Treatment.	<p>Operative treatment imperative as soon as diagnosis can be made.</p> <p>Extraperitoneal exploration by incision, as for suprapubic cystotomy.</p> <p>If injury is found, suturing or drainage of bladder.</p> <p>In intraperitoneal wounds abdominal section and suturing of visceral wounds.</p> <p>Visceral wound should be closed by Lembert sutures of fine silk.</p> <p>Irrigation of peritoneal cavity with sterilized water.</p> <p>Drainage in case peritonitis has set in.</p> <p>Seven out of sixteen cases thus treated have recovered.</p> <p>MacCormac established this operation.</p>
Atony of bladder.	General remarks.	<p>Very common in males past middle life.</p> <p>Atony from fatty and fibroid change of vesical muscles.</p> <p>Most common form due to obstruction and over-distention of the organ.</p> <p>Residual urine is the urine left in bladder after micturition.</p> <p>Decomposition of urine and cystitis.</p> <p>Paralysis of bladder, caused by lesions of central nervous system.</p>
	Treatment.	<p>Aseptic systematic catheterization, two to four times daily.</p> <p>Antiseptic injections of boracic acid or permanganate of potash, three grains to the ounce.</p> <p>Electricity as advised by Henry Thompson.</p> <p>Strychnia alone, or in combination with ergot, cantharides, or tincture of iron.</p>
Urinary calculus.	Normal composition of urine.	<p>Solids, 10 per cent. ; water, 90 per cent.</p> <p>Organic constituents, urea and uric acid.</p> <p>Inorganic constituents consist of bases—chiefly sodium, potassium, and magnesium.</p> <p>Uric, phosphoric, and sulphuric acids form salts.</p> <p>These, with the chlorides, make up the bulk of inorganic substances.</p>
	Chemistry of urinary calculi.	<p>Mucus from kidney and bladder, and renal and vesical epithelium.</p> <p>Uric acid in normal urine 1:1000; this and its salts form the bulk of most deposits.</p> <p>Oxalic acid sometimes found in combination with lime; octahedral, dumb-bell crystals.</p> <p>Phosphatic deposits, when acid, form deposits.</p> <p>Cystine, a rare constituent of urine, contains 25 per cent. of sulphur.</p> <p>Mucus and muco-pus necessary to form deposits.</p>

Urinary calculus (continued).	{	Predisposing causes.	Age. { Children are liable to formation of uric-acid calculi. { Old persons are liable to formation of phosphatic stones. Sex.—Only 5 per cent. in females. Race.—Negroes form only a small (4) percentage in this country. Gout and rheumatism. Hypertrophy of the prostate and stricture. Atony of bladder and renal disease.
			Acid urine forms uric acid, oxalate of lime, urates, cystine, and xanthine calculi. Alkaline urine forms carbonate or phosphate-of-lime calculi. Ammoniac-magnesian variety is formed from ammoniacal urine. About two-thirds of all stones contain nucleus of uric acid. In remaining cases nucleus of oxalate of lime or urates, mucus, blood, or foreign body. In shape they are round, oval, irregular, or faceted. In size they vary from that of a birdshot to several inches in circumference. Largest stone removed successfully, without fragmentation, in this country by White, weighed nine and a half ounces.
		{	
	{	Symptoms.	Previous attack of nephritic colic. Frequent urination—more marked by day than by night. This symptom more marked if stone is small, movable, and rough. Pain of a smarting, burning character; most frequent at end of urination. It is most severe on under surface of urethra, back of meatus. This symptom is more prominent in children than in men. If stone is encysted this symptom may be entirely absent. Sudden interruption of the stream during urination. This symptom is present only when stone is small and movable. Hematuria is of diagnostic value only when associated with other symptoms. This symptom is more frequent in adults than in children. Muco-pus indicates the existence of complicating cystitis.
			Reflex pains in rectum, perineum, or more distant parts of body.
			A positive diagnosis can only be made by sounding the bladder. Thompson's searcher is the most useful instrument for this purpose. Position of patient during such an examination. The bladder should be moderately distended with water.
			Method of exploration: finger in rectum serves a useful purpose in aiding the examination.

Urinary calculus (continued).	Diagnosis (con- tinued).	Occasionally the erect posture aids greatly in finding the stone. Sources of failure in detect- ing stone. { Encysted stone. Stone in diverticulum. Attachment of stone to fundus or anterior wall of bladder. Envelope of blood or lymph around stone. Measuring stone with Thompson's searcher.
	Treatment.	Prophylactic. { Acids or alkalies according to composition of urine. Regulation of diet. Active exercise. Pure water in large quantities. A stone once formed cannot be dissolved in bladder by any known safe treatment. Operative treatment. { Perineal lithotomy. { Lateral. Median. Bilateral. Suprapubic lithotomy. Rectal lithotomy (obsolete). Litholapaxy.
	Indications for the different methods.	Perineal lithotomy { Deep-seated and intractable stricture. in adults. { Moderate-sized and hard stones. Atony of bladder. Suprapubic lith- { Large and hard stones. otomy. { Hypertrophy of prostate. When renal complications exist. Litholapaxy. —In all other cases.
	Preparatory treatment for operations for stone in bladder.	General health should be attended to. Condition of kidneys should be ascertained. Rest for two or three days. If urine is ammoniacal, catheterization and antiseptic irrigation. Administration of salol or boric acid in five-grain doses. Milk diet, laxatives, and enemata. Disinfection of site of operation.

Urinary calculus
(continued).

Perineal lithotomy.

Popularized by Frère Jacques in end of seventeenth century, and perfected by Chiselden in early part of nineteenth century.

A safe operation in children.

Anatomy of perineum, as applied to this operation.

Instruments required.

Scalpel.

Hemostatic forceps.

Lithotomy knife.

Grooved staff.

Lithotomy forceps.

Large rubber catheter.

Catheter *en chemise*.

Lithotrite.

Position of patient.

Introduction and holding of staff.

External incision from a point to left of median line, $1\frac{1}{4}$ inches in front of anus, to midway between tuber ischii and anus.

Cutting down upon staff, using left index finger as a guide.

Deep incision; digital or instrumental dilatation of deep wound.

Extraction of stone.

Digital exploration of bladder.

Irrigation of bladder through wound.

Arrest of hemorrhage.

Drainage of bladder and dressing of wound.

Complications during operation.

Transverse laceration of urethra.

Urethra not incised.

Wounding of rectum.

Wounding posterior wall of bladder.

Median lithotomy.

Incision made in median line between scrotum and anus.

Position of patient and instruments same as in above operation.

Deep incision passes through membranous portion of urethra three-quarter inch.

Digital dilatation of prostatic portion of urethra.

Operation is attended by little hemorrhage, and ejaculatory ducts are not wounded.

Incision encroaches close upon bulb in front and rectum behind.

This operation is not adapted for large stones.

Urinary calculus (continued).	Suprapubic lithotomy.	<p>Anatomical points.</p> <p>Preparation of patient.</p> <p>Technique of operation.</p>	<p>Disinfection of field of operation.</p> <p>Position of patient.</p> <p>Insertion of rectal bags and injection of eight to ten ounces of water.</p> <p>Injection of ten to twelve ounces of boric-acid solution into bladder.</p> <p>In children a correspondingly smaller quantity is used.</p> <p>External incision in median line, three inches in length, half inch above pubes.</p> <p>Blunt separation of muscles without tearing.</p> <p>Division of transversalis fascia.</p> <p>Division of prevesical fat.</p> <p>Arrest of hemorrhage.</p> <p>Fixation of bladder with sharp hook.</p> <p>Incision of bladder from hook downward.</p> <p>Fixation of margins of wound with tenacula.</p> <p>Insertion of two fingers and removal of stone.</p> <p>Suture of bladder in aseptic cases.</p> <p>Drainage of bladder in all other cases. { Through urethra. Through wound.</p> <p>Dressing of wound.</p> <p>After-treatment.</p> <p>Operation in two stages (Senn).</p>
	Litholapaxy.	<p>Crushing and removal of stone in one sitting.</p> <p>Devised by Bigelow of Boston in 1878.</p> <p>Bigelow's lithotrites and evacuator.</p> <p>Preparation of patient.</p> <p>Insertion of instrument, grasping of stone, and crushing.</p> <p>All movements with instruments should be gentle.</p> <p>Seizing and crushing of stone and fragments should occupy from fifteen to thirty minutes.</p> <p>In adults evacuating tube should have a calibre of 28-30 (French).</p> <p>Washing out fragment and difficulties met with in this part of the operation; after-treatment.</p> <p>This operation is strongly condemned by Freyer and Velpeau in the case of children.</p> <p>The former has since endorsed it, and operated on forty-nine boys without a death.</p> <p>Recurrence more frequent after litholapaxy than after lithotomy.</p>	

Urinary calculus (continued).	Vesical calculus in females.	Rarity of vesical calculus in females is due to shortness and dilatability of urethra and infrequency of vesical disease.	
		Small stones should be removed through urethra, which should be slowly dilated.	
Cystitis.	Pathological and varieties.	etiological	Acute, chronic.
			Tubercular, gonorrhœal.
	Acute cystitis.	Causes.	Trauma.
			Foreign body.
			Cantharides.
			Pus microbes.
	Acute cystitis.	Pathology.	Gonococcus.
			Hyperæmic swelling of mucous membrane.
			Shedding of epithelial cells.
			Deposits of tenacious lymph—membranous cystitis.
	Acute cystitis.	Symptoms.	Ulceration; infiltration of coats of bladder.
			Extension of inflammation along ureters to kidney.
			Increased frequency of urination, each act not followed by sense of relief.
			Tenesmus.
	Chronic cystitis.	Symptoms.	Pain referred to neck of bladder, hypogastrium, perineum, loins, or down the thighs.
			Changes in the urine; urine contains mucus, blood, pus, and bladder epithelia.
			Constitutional disturbance usually not in proportion to severity of local symptoms.
			May be same as those which produce acute form.
	Chronic cystitis.	Causes.	Usually the result of a combination of mechanical and chemical results.
			Hypertrophy of prostate and stricture.
			Vesical tumors and calculus.
			Paresis or paralysis of bladder.
	Chronic cystitis.	Causes.	Bacillus of tuberculosis.
			Pus microbes.
	Chronic cystitis.	Causes.	Gonococcus.

Cystitis (continued).	Chronic cystitis (continued).	Pathology.	<ul style="list-style-type: none"> Atony of vesical wall with fatty degeneration of muscular coat; dilatation of bladder. Contraction of organ and hypertrophy of muscular and fibrous coats. Sacculation of bladder. Ulceration, particularly in tubercular variety.
		Symptoms.	<ul style="list-style-type: none"> Symptoms of acute form, mitigated. Urination not so frequent; pain and tenesmus less severe. General symptoms caused by the nature and condition of local disease. Urine seldom contains blood, but products of inflammation. Urine usually ammoniacal, and contains large quantities of mucus and phosphates.
Cystitis (continued).	Treatment (acute and chronic).		<ul style="list-style-type: none"> Removal of causes if possible. In acute form rest in bed, restricted diet, and diluent and alkaline drinks. Saline cathartics and opium for rectum prove useful in acute form; in chronic form mechanical cause should be looked for, and, if possible, removed. In chronic form internal use of balsam copaiba, cubebs, and vegetable diuretics are useful. Under the same head come salol and boric acid. Nitrate of silver, $\frac{1}{2}$-2 per cent.; peroxide of hydrogen, 25 per cent. to full strength; permanganate of potassium, $\frac{1}{2}$-4 per cent.; boric acid, from 2-10 per cent.; creoline, from 1-5 per cent.; corrosive sublimate, from 1 : 15000-1 : 5000; trichloride of iodine from $\frac{1}{4}$-1 per cent. (in tubercular variety). Perineal drainage. Suprapubic fistula.
Tumors of the bladder.	Varieties.	Benign.	<ul style="list-style-type: none"> Fibromata and fibromyxomata. <ul style="list-style-type: none"> Grow from submucous coat. Are either sessile or pedunculated. Are always covered by mucous membrane. Papillomata. <ul style="list-style-type: none"> Spring from superficial layer of mucous membrane. Occasionally sessile, but usually pedunculated. Surface covered by mucous membrane. They are exceedingly vascular and bleed easily. Transformation into malignant tumors.

Tumors of the bladder (continued).	Varieties (continued).	Malignant.	Carcinoma.	<ul style="list-style-type: none"> Much more frequent than sarcoma. Springs from mucous membrane or its glands. Most frequently about neck of bladder. Early ulcerations. Pelvic glands frequently involved.
			Sarcoma.	<ul style="list-style-type: none"> Springs from connective tissue. Tumor attains larger size before ulceration takes place. Extension to pelvic glands rare.
	Symptoms.	<ul style="list-style-type: none"> Vesical irritation and hemorrhage; papilloma often gives rise to profuse hemorrhage. Fibroma and carcinoma for a long time may simulate cystitis before urine changes take place. 		
	Diagnosis.	<ul style="list-style-type: none"> Recognition in early stages difficult. Most frequent and reliable symptom is hemorrhage, urine remaining clear. 		
		<ul style="list-style-type: none"> Hemorrhage often profuse after gentle sounding. Symptoms of cystitis without signs of this disease very suggestive. Examination of fragments of tissue passed with urine or removed with catheter. Value of the cystoscope as a diagnostic measure and its method of use. 		
Diseases and injuries of the urethra.	Treatment.	<ul style="list-style-type: none"> Perineal route only advisable for the removal of single pedunculated tumors about neck of bladder. Suprapubic cystotomy should receive the preference in the great majority of cases. If bladder is opened through perineum a median incision should be made. The tumor should be located with finger, grasped at its base with forceps, and twisted off. Tumor removed with forceps, écraseur, cautery, enucleation, or sharp spoon; cleansing of bladder and drainage. 		
		<ul style="list-style-type: none"> Spongy or penile portion is about 9 inches in length. Membranous portion is $\frac{1}{2}$ to $\frac{3}{4}$ inches long; prostatic portion same length as membranous. 		
	Catheterism.	<ul style="list-style-type: none"> Urethral canal; curves of urethra. Should always be regarded as an operation of great delicacy. In using metallic catheter it is necessary to remember the curves of urethra. 		
		<ul style="list-style-type: none"> Position of patient; manner of inserting catheter. Force should never take the place of skill. 		
		<ul style="list-style-type: none"> Enlarged prostate necessitates use of catheter with long shaft and large curve. If lumen of urethra is much narrowed by stricture, filiform bougie and tunnelled catheter will be of great service. Aseptic catheterization; precautions in the use of rubber catheters. 		

Rupture of the urethra.	Location.	{ Pendulous portion of the urethra seldom the seat. The deeper part of urethra usually affected.
	Causes.	{ Unskilful catheterization. Falls, astride of hard or resisting bodies.
		{ Mechanism of rupture. { Velpeau—crushing of urethra between pubes and offending body. Ollier—pressure of canal against sharp edges of subpubic ligament. Terillon—crushing of urethra against ramus of pubes. Guyon—urethra crushed against resisting pubic symphysis. Duplay—temporary dislocation of symphysis pubis.
	Diagnosis.	{ Partial and complete rupture. History of the accident. Urination difficult or impossible. Hemorrhage from urethra. Perineal or scrotal swelling caused by hemorrhage or extravasation of urine.
	Treatment.	{ Classification, according to Guyon and Duplay, into mild, moderate, and grave. In mild cases, with no extravasation and of easy catheterization, systematic use of catheter and rest. In moderate cases, retaining catheter, using full size. In grave cases, external urethrotomy, perineal drainage, and, in case proximal end of urethra cannot be found, suprapubic cystotomy and retrograde catheterization. Suturing, in complete rupture, has been done successfully by Guyon, White, Keys, and others. Catgut should be used, and stitches should not include mucous membrane.

GONORRHOEA.

Specific inflammation of mucous membrane of urethra caused by the gonococcus; this microbe was discovered by Neisser, who demonstrated its specific pathogenic properties by culture and inoculation experiments.

Simple urethritis is caused by pyogenic microbes.

Clinically, it resembles specific urethritis closely; methods of infection.

As a rule, somewhat less severe and less protracted; an attack of either variety does not secure immunity against future attacks.

Clinical varieties. { Typical or acute inflammatory.
Subacute or catarrhal.
Irritative or abortive.

Period of incubation, viz.: interval elapsing from exposure to first symptoms is from a few hours to fourteen days.

Symptoms of first stage.	<p>Swelling of meatus and beginning of urethral discharge.</p> <p>Tingling or scalding during urination, referred to meatus.</p> <p>These premonitory symptoms are followed within forty-eight hours by first or increasing stage.</p> <p>Lips of meatus everted or even eroded.</p> <p>Lumen of urethra at this point much narrowed.</p> <p>Ardor urinæ (<i>chaude pisser</i>).</p> <p>Chordee—painful erection, most distressing during night.</p> <p>Pathological conditions concerned in the production of chordee.</p> <p>Frequent urination and vesical tenesmus.</p> <p>These symptoms indicate extension of inflammation to the deep urethra.</p> <p>Discharge during this period becomes more profuse and purulent.</p>
Complications of first stage.	<p>Balanitis, inflammation of surface of glans penis.</p> <p>The superficial ulcers which sometimes accompany this affection should not be mistaken for chancre.</p> <p>Balano-posthitis, extension of inflammation from surface of glans to inner surface of prepuce; usually associated with phimosis.</p> <p>Phimosis, contraction of preputial orifice, congenital or acquired.</p> <p>Differentiation between gonorrhœal phimosis and same condition with subpreputial chancre.</p> <p>Paraphimosis, prepuce retracted and caught behind corona glandis.</p> <p>Contraction and inflammation may be so severe as to produce gangrene.</p>
Symptoms of second stage.	<p>Discharge profuse and purulent.</p> <p>Ardor urinæ, chordee often distressing.</p> <p>Sometimes point to extension to deep urethra.</p> <p>This stage usually lasts from end of first to end of second week.</p>
Complications of second stage.	<p>Follicular and periurethral abscess.</p> <p>Follicular abscesses are closed, follicles containing pus.</p> <p>If such an abscess opens in direction of skin periurethral abscess results.</p> <p>Most frequent about fossa navicularis and anterior part of membranous urethra.</p> <p>Lymphangitis results in consequence of secondary infection with pyogenic microbes.</p> <p>Lymphatics of dorsum of penis most frequently affected.</p> <p>Gonorrhœal bubo occurs either with or without lymphangitis.</p> <p>Glands usually affected are the superficial, just below Poupert's ligament.</p> <p>Inflammation may terminate in resolution.</p> <p>If suppuration takes place, paraglandular abscess forms, and gland is infiltrated with pus and liquefies.</p> <p>Cowperitis—inflammation of one or both of Cowper's glands.</p>

Complications of second stage (continued).	<ul style="list-style-type: none"> The structures, like all other complications, are affected by extension of infection. Pain, throbbing and severe, owing to tension surrounding the inflamed glands. Suppuration around glands leads to formation of deep perineal abscess. Prostatitis; follicles, and glandular elements primarily and chiefly affected; first symptoms, feeling of weight and distention in perineum and rectum. Pain at the close of urination and during defecation. Suppuration takes place only in exceptional cases. Pus is frequently discharged into urethra, sometimes into rectum. Fibrous induration, which follows, may lay groundwork for future trouble; acute affection may become chronic. Cystitis is often initiated as a prostatico-cystitis. Gonorrhœal cystitis has same symptoms as suppurative cystitis. General symptoms not severe, and general health not impaired, unless affection runs a protracted course. Differential diagnosis between prostatitis and cystitis.
Symptoms of third stage.	<ul style="list-style-type: none"> Urination becomes less painful and frequent. Discharge becomes thinner and scanty, or ceases entirely. Chordee no longer appears.
Complications of third stage.	<ul style="list-style-type: none"> Epididymitis, inflammation of the epididymis. Occurs usually during fifth or sixth week. Result of extension of inflammation along ejaculatory ducts. Pain along course of spermatic cord. Cord is enlarged and tender. Pain of a nauseating quality. Scrotum purplish in color. Resolution may occur in a few days, but swelling disappears slowly. In some cases phlegmonous inflammation of scrotum ensues. Sterility a frequent sequela. Left testicle more frequently affected.
Subacute or catarrhal gonorrhœa.	<ul style="list-style-type: none"> Occurs most frequently in persons who have had a previous acute attack. Irritating quality of urine and erection as prominent causes. Infection with pyogenic microbes a frequent exciting cause.

Subacute or catarrhal gonorrhœa (continued).	Symptoms	Free mucopurulent discharge. Pain during urination slight. No vesical irritability. Chordee absent or very slight. Complications infrequent. Only affection that may be mistaken for it is urethral chancre. Under treatment discharge diminishes. Meatus pasted together in the morning.	
	Complications.	Gonorrhœal rheumatism.	May appear at any time during an attack. More common in men than women. Comes on suddenly; discharge lessens at this time. It is a form of septic infection. Symptoms. { Slight chill; slight rise in temperature. Knee, ankle, wrist, or elbow most frequent seat. Swelling comes on quickly. May become a panarthrititis. Differential diagnosis from ordinary rheumatism.
		Gonorrhœal ophthalmia.	Sclerotic coat, iris, and oculo-palpebral conjunctiva most frequently affected. Symptoms of iritis and conjunctivitis. Disease tends to run a chronic course. Gonorrhœal conjunctivitis always the result of direct inoculation. Symptoms of this disease. Ulceration of cornea and destruction of eye often result. Differential diagnosis between gonorrhœal conjunctivitis and gonorrhœal ophthalmia.
Irritative or abortive gonorrhœa.	Slight pain and itching at meatus. Congestion of mucous membrane of meatus and slight mucous discharge. Local conditions the same as during initial stage of gonorrhœa. Symptoms remain stationary. In a week or ten days spontaneous cure without sequelæ. Differential diagnosis between the three forms of urethritis.		

Chronic urethral discharges.	{ As direct continuation of acute attack or remote sequelæ.	
	Three classes.	{ Urethral catarrh. Chronic gonorrhœa. Gleet.
	Urethral catarrh.	{ Hypersecretion after cessation of attack of gonorrhœa. Discharge a clear albuminoid liquid. Usually associated with prostatorrhœa. Will subside spontaneously.
	Chronic gonorrhœa.	{ Discharge a creamy or milky fluid. Usually found in fossa navicularis. Meatus a little reddened and swollen. Slight scalding on urination. Painful erections. Continuation of symptoms from acute attack.
	Gleet.	{ Remnant of one or repeated attacks of gonorrhœa. Mucopurulent discharge. Lips of meatus glued together in the morning. At this time a drop of muco-pus in fossa. Often dribbling of urine at end of micturition.
		Differential diagnosis. { Urethral catarrh. Chronic gonorrhœa. Gleet.
	Chronic follicular prostatitis.	{ Undue frequency of micturition. Pain in end of penis at termination of act. Sensation of pain or fulness in perineum and rectum. Diminution in force of stream and dribbling. Turbidity of urine first discharged. Urine contains prostatic epithelia and muco-pus, and often casts of follicles and prostatic ducts. Often sexual excitability.

Treatment of gonorrhœa.	<p>The treatment should be adapted to stage of disease. Abortive treatment in acute cases not to be advised.</p> <p>Removal of sources of irritation. { Diminished blood supply to affected part. Abstinance from sexual excitement. Render urine non-irritating.</p> <p>Rest in recumbent position. Avoidance of exaltation of sexual impulse. Skimmed milk diet; alkaline drinks, such as Apollinaris, Seltzer, and soda water. Alkaline hydragogue diuretics. Absorbent aseptic dressing for meatus and glans penis.</p>
Treatment of ardor urinæ.	<p>Alkaline diuretics, such as acetate or citrate of potassium. Immersion of penis in hot water. Alkaline cathartics.</p>
Treatment of chordee.	<p>Evacuation of bowels before retiring. Cool bedroom and hard mattress. Opium suppositories at bedtime. Lupulin and camphor. Bromide of potassium and tinctura belladonnæ. In severe cases leeching of perineum; spinal ice-bag. Blunt-pointed hard-rubber syringe holding three drachms. Manner of using syringe, and position of patient. Injection should not reach beyond diseased surface. Fluid should be retained for two or three minutes.</p>
Urethral injections in early stage.	<p>The pain caused by an injection should not exceed a sense of smarting. As mixed infection with pus-microbes is usually present, injections should be antiseptic. During early stage gonococci are found in papillary layer; later, on the surface. Gonococci more resistant to antiseptics than pus-microbes. Ordinary antiseptics used strong enough to destroy gonococci are too irritating. Resorcin, quinine, sulphate and acetate of zinc are unreliable. Iodoform, calomel, bismuth, oxide of zinc are of too limited antiseptic properties; corrosive sublimate, sulpho-carbolate of zinc, and peroxide of hydrogen are useful agents. Internal use of cubebs and balsam copaibæ. Same can be said of sandalwood, eucalyptus, gurjun, and kava-kava. These remedies can be used with salol.</p>

Treatment of persistent urethral discharges.	{	Strength of injections must be increased.
	{	Solution of sulphate of zinc, five to six grains to an ounce.
	{	Other metallic or vegetable astringents may be tried.
Treatment of urethral catarrh.	{	Importance of general tonic treatment.
	{	Astringent injections; use of bougies.
Treatment of chronic gonorrhœa.	{	Search for sensitive points by insertion of bulbous bougie.
	{	Use of urethroscope; employment of prostatic catheter.
	{	Injection of half drachm of a 1-2-per-cent. solution of nitrate of silver.
	{	This can be followed by ordinary solution for injection.
	{	Spasmodic strictures call for full-sized bougies; they may prevent entrance of fluid to deep urethra.
	{	Irrigation of urethra in obstinate cases.
Treatment of gleet.	{	Careful examination for stricture of large calibre.
	{	Posterior layer of triangular ligament and spasmodic stricture.
	{	Balanitis. { Cleanliness.
		{ Desiccant powder.
		{ Dilute alcohol.
	{	Balano-posthitis. { Lead-water and opium applications.
		{ Application of thirty- to forty-grain solution of silver nitrate.
	{	Phimosis. { Circumcision, or splitting open of prepuce.
		{ Lead and opium wash externally and by injection.
	{	Para-phimosis. { If ordinary method of reduction does not succeed, remove œdema by elastic [bandage.
		{ Division of constriction on dorsum of penis.
Treatment of complications.	{	Follicular abscess. —If spontaneous evacuation does not take place, incision.
	{	Peri-urethral abscess. —Early incision.
	{	Lymphangitis. —Rest and evaporating sedative lotions.
	{	Bubo. —Antiseptic fomentations and incision if pus forms.
	{	Cowperitis. —Leeching perineum, elevation of hip, hot sitz baths, incision.
	{	Prostatitis and cystitis. { Rest in bed; limited diet.
		{ Alkaline diuretic mixture.
		{ Leeching of perineum.
		{ Pain controlled by rectal enema containing laudanum.
		{ Bromide of lithium, five grains every three hours.
		{ Urethral injections should be suspended.

Treatment of complications (continued).	Retention of urine.	{ Hypogastric hot fomentations. Use of Nélaton's elastic catheter. Strictures must be looked for and treated.
	Prostatic abscess.	— Median perineal incision.
	Chronic prostatitis.	{ Removal of stricture and other predisposing causes. Restriction of diet. Cold water rectal enemata daily. Cold hip baths.
		{ Catheterization of prostatic urethra.
		{ Limited diet.
		{ Application to perineum of tincture of iodine and belladonna. Mixture of bromide and citrate of potassium. Application of cold.
	Epididymitis.	{ Rest in bed. Elevation of scrotum; strapping of testicle. Leeching along line of the cord. Cooling and anodyne lotions. Internal use of aconite and potassium bromide.
		{ External use of iodine and mercury.
		{ Affection obstinate and treatment unsatisfactory. Infection of joint with gonococci or pus-microbes. Local and general treatment.
		{ Warm collyria.
		{ Blisters and leeches to temple. Instillations of atropine. Warm foot-baths and other revulsives.
	Gonorrhœal conjunctivitis.	{ A grave affection, to be treated by specialist. Exclusion of light. Scarification of conjunctiva. Cauterization with nitrate of silver. Leeches to temple. Atropine. Puncture of anterior chamber if intraocular pressure is excessive. Perfect cleanliness.

GONORRHŒA IN THE FEMALE.

Not as frequent or as serious in its results as in the male.

Vulva, vagina, urethra, uterus, or Fallopian tubes are the seat of the disease.

Vulva and vagina most exposed to injury and infection.

Vulvitis.	Causes.	{ Extension of inflammation from vagina. Worms; secretions from mucous patches. Uncleanliness. Trauma and infective agents.	
		{ Appears, according to Dupuytren, occasionally as an endemic in children.	
	Symptoms.	{ Itching and burning. Swelling—may extend beyond vulvo-femoral folds. Muco-purulent or purulent discharge.	
		{ Bubo.—Less frequent than in the male; may suppurate.	
Vaginitis.	Complications.	{ Vulvo-vaginal abscess.	{ Usually in glands of Bartholin. Swelling can be felt most distinctly in vagina. Should be treated by early and free incision. Recurrence frequent.
	Causes.	{ Purulent discharge from male urethra. Violent or excessive copulation; contusions; leucorrhœa; syphilis.	
		{ Inflammation usually begins at the lower and posterior aspect of canal. Weight and fulness experienced first is often referred to rectum.	
	Symptoms and complications.	{ Mucous membrane at first dry and glazed. Discharge first mucoid, later purulent.	
		{ Vesical irritability and tenesmus; pelvic and hypogastric pain.	
Urethritis.	Chronic vaginitis.	{ Purulent discharge. Thickening of mucous membrane, and enlargement of its papillæ.	
	Causes.	{ With few exceptions of gonorrhœal origin. May be caused by extension of inflammation from vulva or vagina.	
		{ Discharge not profuse, owing to shortness of canal.	
	Symptoms.	{ Ardor urinæ and tenesmus. Early bladder involvement. Pus can be found by stripping urethra. Meatus and its margins everted and sometimes surrounded by vegetations.	

Uterine gonorrhœa.	{		Extension of gonorrhœal vaginitis to cervical canal usually an early occurrence.
	{		Copious viscid discharge from cervix.
Treatment of gonorrhœa in women.	{		From the cervical canal it may extend to cavity of uterus, Fallopian tubes, and peritoneum.
	Vulvitis.	{	Rest in bed with pelvis elevated.
			Perfect cleanliness and dryness of the affected parts.
			Use of strong solution of sodium bicarbonate externally.
			Solution of lead-water and opium.
			Warm baths, laxatives, and restricted diet.
	Vaginitis.	{	Suppuration of vulvo-vaginal gland should be treated by free incision.
			In chronic suppuration of this gland, curetting and packing of wound with iodoform gauze.
			Same general treatment as vulvitis.
			Copious alkaline injections every two hours, to be followed in acute cases by injection of acetate of lead solution.
			After cessation of acute symptoms, sulphate of zinc solution, or sublimate 1 : 10,000–1 : 20,000.
			In chronic cases nitrate of silver, 40–60 grains to the ounce.
	Urethritis.	{	This affection runs a rapid course in the female.
			Injections, if used, should be made by the surgeon.
			Same solutions can be used as in the male.
			Internally resinous diuretics are beneficial.
Endometritis.	{	{	In chronic cases, strong solution of nitrate of silver.
			Local applications of nitrate of silver for abrasions.
			Tampons or suppositories applied through speculum.
			Iodoform, iodine, and other local gynecological remedies.

STRICTURE OF URETHRA.

Definition: an abnormal lessening of the calibre or of the dilatability of the urethral canal, associated with changes in the mucous, muscular, or submucous structures composing its walls.

Clinical and etiological varieties. {

- Inflammatory.
- Spasmodic.
- Organic.

Inflammatory stricture. {

- The existence has been denied by eminent authorities.
- This form of stricture is rare and of short duration.
- Treatment advised for urethritis appropriate.

Stricture of the urethra (continued).	Spasmodic stricture.	<p>Contraction of unstripped muscular fibres or compressor urethra.</p> <p>Always depends on some local irritation.</p> <p>Sometimes complicated by existence of organic stricture.</p> <p>Warm baths, atropia or morphia per rectum or hypodermically.</p> <p>Removal of exciting cause; diluents.</p>
	Organic stricture.	<p>Always the result of antecedent injury or disease.</p> <p>Usually the result of protracted or recurring urethritis.</p> <p>Degree and extent of stenosis.</p> <p>Anatomical varieties.—Linear; annular; tortuous.</p> <p>Location. { In majority of cases bulbo-membranous region. Next most frequent seat first two and a half inches of urethra. Smallest number in middle of spongy region. Traumatic strictures usually affect membranous portion.</p> <p>Pathological varieties. { Irritable. Resilient. Small caliber (15 mm.). Large caliber.</p> <p>Relation of caliber of urethra to circumference of penis not definite, as claimed by Otis.</p> <p>Home, De Camp, and Reybard demonstrated size and dilatability of different portions of urethra.</p> <p>Sands and Weir proved correctness of these observations by casts of urethra.</p> <p>Bougie à boule best instrument for detecting stricture.</p> <p>If meatus is small or contracted it must be enlarged.</p>
Stricture of large caliber, of more than No. 15 French, behind bulbo-membranous junction.		<p>Gradual dilatation with aseptic conical steel sounds.</p> <p>Patient must be instructed in the use of the instrument.</p> <p>Internal urethrotomy not safe nor curative.</p> <p>In this region the risks of cutting operations are much reduced.</p> <p>Probability of permanent cures much increased.</p> <p>Physiological variations in the caliber of normal spongy urethra considerable.</p> <p>Internal urethrotomy preferred in strictures of long standing.</p>
Strictures of large caliber occupying pendulous urethra.		<p>Permanent cure by this treatment only in exceptional cases.</p> <p>This treatment is especially indicated in hospital and dispensary practice.</p> <p>In private cases it is indicated only in one out of eight or ten cases.</p> <p>Strictures of large caliber not only give rise to symptoms of obstruction, but also reflex pains.</p> <p>Gleet is frequently associated with this condition.</p>

Strictures of meatus and fossa navicularis.	<p>In this region dilatation is peculiarly unsatisfactory.</p> <p>Division of stricture by cutting should always be practised.</p> <p>Meatotomy should be done with probe-pointed tenotome.</p> <p>Floor of urethra should be incised.</p> <p>Suturing of mucous membrane to external margin of wound with fine catgut.</p>
Strictures of small caliber in front of bulbo-membranous junction.	<p>Include strictures less than 15 French scale.</p> <p>If soft and in its early stage, well adapted for internal urethrotomy.</p> <p>Operation consists in a linear section in the roof of the urethra.</p> <p>Preliminary section with Maisonneuve's instrument should be done.</p> <p>This to be followed by use of dilating urethrotomes.</p> <p>After operation large-sized catheter should be inserted and retained.</p> <p>Operation should be performed under strictest antiseptic precautions.</p> <p>Full-sized bougie should be passed every few days for several weeks.</p>
Stricture of small size at or deeper than bulbo-membranous portion.	<p>These strictures are surgically most important.</p> <p>Usually accompanied by gleet and marked vesical symptoms.</p> <p>Choice of treatment between gradual dilatation and some form of urethrotomy.</p> <p>Divulsion is clumsy, dangerous, and uncertain.</p> <p>Dilatation should at first be tried.</p> <p>Should not go below 8 or 10 French scale, as a rule, in the use of metallic instruments.</p> <p>Instruments should be allowed to remain in from five to ten minutes.</p> <p>Attempt should be repeated every twenty-four to seventy-two hours.</p> <p>Internal use of salol or boric acid is of great value.</p> <p>In a few days larger instruments can be used in succession.</p> <p>In from two to three weeks normal caliber is reached.</p> <p>Occasional introduction of sound after this time is advisable.</p> <p>Perineal urethrotomy is indicated in resilient, irritable, or traumatic strictures.</p>
Strictures of deep urethra permeable only to filiform bougie.	<p>Efforts to insert filiform bougie should be made persistently and patiently; end of instrument should be bent sharply to find marginal opening.</p> <p>Several bougies introduced at same time facilitates finding of opening.</p> <p>If bougie can be engaged in stricture, but does not pass, it should be fastened and retained for twenty-four hours.</p> <p>If bougie can be inserted, proceed in one of the following ways.</p> <div> <p>Retain it in urethra for two days.</p> <p>Insert over tunelled catheter.</p> <p>Pass grooved staff and perform external urethrotomy.</p> <p>Use it as a guide for Maisonneuve's urethrotome.</p> </div>

Impassable stricture of the deep urethra.	{ Perineal section becomes a necessity.	
	{ Desault's boutonniere and Cock's modification consists in opening urethra behind the stricture.	
	{ Syme's external urethrotomy includes division of stricture.	
	{ Perineal section, introduced by Hunter, Grainger, and C. Bell, means cutting into urethra in impermeable strictures.	
	{ Extravasation of urine.	{ From meatus to scrotum, swelling of penis.
		{ From scrotum to bulb, swelling limited by deep layer of superficial fascia.
		{ Bulbous region, swelling in direction of scrotum and abdomen.
		{ Membranous urethra between triangular ligament, swelling limited by this structure.
		{ Prostatic portion, swelling along rectum.
	{ Extravasation makes perineal section a necessity.	
	{ In impermeable stricture, method of Wheelhouse is the best.	
	{ If in traumatic stricture, proximal end cannot be found, suprapubic cystotomy and retrograde catheterization are indicated.	
	{ Retained catheter of much value after perineal section.	
	{ Regular catheterization after removal of perineal drain.	

DISEASES OF THE PROSTATE GLAND.

Anatomy.	{ Is rather a muscle than a gland.	
	{ Situated at neck of bladder and around first inch of urethra.	
	{ Glandular structure between outer and inner muscular layers.	
	{ Is composed of two lateral and a middle or third lobe.	
	{ The ejaculatory ducts pass through it.	
	{ Its chief function is genital and ejaculatory.	
Wounds.	{ About the size of a horsechestnut; weight, half an ounce.	
	{ Are very rare, and when occur complicate penetrating wounds of perineum; gland is wounded in perineal lithotomy.	
Atrophy.	{ If capsule is cut there is great danger of pelvic cellulitis and peritonitis.	
	{ Has no recognizable symptoms.	
	{ Follows double castration, wasting disease, and sometimes occurs in the aged.	

Hypertrophy.	Takes place in about one-third of all males past middle age.	
	In about one-tenth of all males over fifty-five years enlargement becomes pathological.	
	Pathology.	Enlargement usually general. Nodules in gland resemble fibro-miomata of uterus. Glandular elements remain unaffected. Any one of the lobes may be more enlarged than the rest. In extreme cases, prostatic portion of urethra measures three to four inches. Urethra is often twisted and tortuous. Gland is enlarged in a backward direction and carries bladder with it. If median lobe is enlarged, it forms valvular obstruction. Sudden obstruction causes dilatation and atony of bladder. If obstruction is chronic, hypertrophy takes place, and pouches are formed. Intravesical growth (McGill). { <div> Projecting middle lobe. Overgrowth of middle and lateral lobes. Enlargement of lateral lobes. Collar-like projection. </div>
	Symptoms.	Frequency of urination. Unnatural sexual desire. Residual urine gradually increases. Enfeeblement of stream. Subacute prostato-cystitis from infection by urine or catheters. Ammoniacal urine. Pyelo-nephritis. General sepsis and uræmia.
	Diagnosis.	Rectal palpation. Catheterization—elongation of urethra. Differential diagnosis. { <div> Acute prostatitis. Malignant disease. Tuberculosis. </div>
Treatment.		Frequency of urination and amount of residual urine. If urine is clear, and residual urine small in quantity, hygienic treatment. Systematic catheterization if urination is frequent and residual urine large in quantity. Catheter should be used from one to four times daily. Use of bromides and belladonna with diuretics.

Hypertrophy (continued).	Treatment (continued).	{ If catheterization does not afford relief, perineal drainage. Median lithotomy. Puncture from perineum with trocar through prostate (Harrison). Self-retaining catheter inserted through canula. Formation of suprapubic urethra (McGuire). Prostatectomy. { Advisable only in exceptional cases. { By perineal incision. { By suprapubic incision. { Suprapubic incision and perineal drainage (Bellfield).
Prostatitis.	Varieties.	{ Acute follicular. { Usually occurs as a complication of gonorrhœa. { It may also occur as a complication of stricture. { Mucous membrane and follicles mainly affected. { Multiple abscesses form if suppuration sets in. { Chronic follicular. { Often appears as sequel of acute attack. { In gonorrhœa it often occurs primarily as a chronic lesion. { Inflammation affects all of the tissues of the gland. { Parenchymatous. { Causes. { Traumatism. { { Tuberculosis. { { Gout. { If suppuration occurs, early and free incision through perineum. { Tubercular prostatitis rare as a primary affection.
	Treatment.	{ In tubercular variety, general hygienic measures. { Local use of 1-5 per cent. solution of nitrate of silver. { Perineal or suprapubic prostatotomy and curetting. { Gouty variety, largely hygienic treatment. { Alkaline waters and restricted diet.
Prostatic cal- culus.		{ Is composed of inspissated secretions. { These become later coated with secondary phosphatic deposits. { Symptoms resemble closely vesical calculus. { Stone remains fixed, and may sometimes be felt between finger in rectum and sound in bladder. { If small, stone can be removed with urethral forceps. { If large and fixed, should be removed by median lithotomy.

Malignant disease of prostate.	{ Both carcinoma and sarcoma affect this organ. If it occurs as a complication of enlarged prostate, diagnosis is difficult. Rapidity of growth and free hemorrhage most important symptoms. Examination by sound and digital exploration of rectum. Radical operation indicated only when growth is limited. Palliation is secured by suprapubic drainage.
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DISEASES OF THE TESTICLE.

Congenital deformities.

Absence of both testicles—cryptorchidism.

Absence of one testicle—monorchidism.

Supernumerary testicle—detachment of globus major from epididymis (Agnew).

Undescended or retained testicle.	{ Usually unilateral, but may affect both sides. Testicle either in inguinal canal, outside external ring, or in perineum. Transplantation of testicle into scrotum, closure of canal. Castration if only one testicle is retained. Epididymitis and orchitis exist either separately or conjointly.
	{ Acute epididymitis. { Usually gonorrhœal in its origin. Also occurs in consequence of injury to urethra.
Inflammation of the testicle.	{ By extension of inflammation from epididymis is rare. Usually results from trauma, or appears as metastatic affection (Mumps). Swollen organ retains its form. Pain dull, nauseating, and radiating toward groin. Hydrocele less frequent than in epididymitis. Suppuration liable to occur in otherwise enfeebled subjects. Infection most frequently through the blood. Softening and atrophy often follow as sequelæ. Bilateral orchitis may result in impotence.
	{ Acute orchitis. { Treatment. { Rest in bed. Elevation of scrotum.

Inflammation of the testicle (continued).	Acute orchitis (con- tinued).	Treatment (continued).	<ul style="list-style-type: none"> Cooling lotions. Hot or cold applications. Laxatives and antipyretics. Aconite and bromide of potassium in appropriate doses. Puncture of tunica vaginalis. Salicylates in rheumatic variety.
	Chronic orchitis.		<ul style="list-style-type: none"> May follow acute attack, but more frequently chronic from beginning. If due to local causes, swelling comes on very slowly. Pain is never severe. In protracted cases atrophy results. Formation of single or multiple abscesses.
		Treatment.	<ul style="list-style-type: none"> General treatment. Ointment of mercury, belladonna, and iodine. Strapping. Castration if multiple abscesses form.
	Tubercular orchitis.		<ul style="list-style-type: none"> Most frequent in persons between twenty and forty. Heredity plays an important part in causation. Epididymis most frequently affected. Pain absent or slight. Swelling irregular and nodular. Formation of tubercular abscesses. Extension of disease along cord to bladder, and from here along ureter to kidney.
		Treatment.	<ul style="list-style-type: none"> If sinuses have formed, and disease is limited to one testicle, cas- tration. If both sides are affected, castration contraindicated. Parenchymatous injections of iodoform emulsion. Curetting and iodoformization of abscesses and sinuses. Parenchymatous injections of trichloride of iodine. Internal use of guaiacol.
	Syphilitic orchitis.		<ul style="list-style-type: none"> Painless affection of testicle. Occurs frequently as a bilateral affection. Swelling dense, irregular, and knotty. Hydrocele a frequent complication.

Malignant disease.	<ul style="list-style-type: none"> Carcinoma usually assumes the soft or encephaloid form. Affects in preference persons under middle age. Appears as a unilateral affection. Affects primarily body of gland. Swelling at first smooth and uniform, later irregular and nodular. Scrotal veins enlarged. Growth often attains enormous size. Ulceration of skin followed by fungous protrusion. Inguinal and pelvic glands early affected. Cystic testicle of A. Cooper is one form of sarcoma. Swelling often appears slowly, and is painless. Tumor often of immense size, resembling hydrocele or hematocele in appearance. Enchondroma another variety of sarcoma; sarcoma proper is composed either of round or spindle cells. <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">Differential diagnosis.</div> <div style="border-left: 1px solid black; padding-left: 10px;"> <ul style="list-style-type: none"> Orchitis and epididymitis. Tuberculosis. Hematocele. Hydrocele. Dermoid cysts. </div> </div> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">Castration.</div> <div style="border-left: 1px solid black; padding-left: 10px;"> <ul style="list-style-type: none"> Strongly advocated by Butlin. Risk to life slight; tendency to recurrence great. Contraindications to operation. Technique. </div> </div>
Sterility.	<ul style="list-style-type: none"> Absence or enfeeblement of spermatozoa. Inability to deposit semen within vagina. Obstruction to escape of semen in seminal ducts. Microscopical examination of recently ejaculated semen.
Impotence.	<ul style="list-style-type: none"> Inability to properly perform the sexual act. Absence of penis, malformation or diminutive size of penis. Disease or injury in portions of the erectile tissue. Disease or injury of the cerebro-spinal axis. Urethral stricture; oxaluria.
Pseudo-impotence.	<ul style="list-style-type: none"> Has its origin in the imagination or in the fear of the patient. Moral treatment most important.

Varicocele.	{	General remarks.	{	Anterior spermatic veins, called Pampiniform plexus. Posterior smaller set accompanied by deferential artery. Veins on left side larger than on right (Spencer). Spermatic artery in front of the cord. Usually Pampiniform plexus, seat of varicosity. Testicle on affected side usually smaller and dartos relaxed. Most frequently met with in young unmarried men. Nearly always affects left side. Left spermatic vein empties into renal, right into vena cava. Left vein is also pressed upon by sigmoid flexure.
		Exciting causes.	{	Occupation. Constipation. Violent exercise. Excessive sexual indulgence.
		Symptoms.	{	Left side of scrotum elongated. Enlarged veins form a tortuous mass. Dull aching pain, extending along cord and into loin. Melancholia a frequent concomitant. Atrophy of testicle in cases of long standing. Swelling more prominent in erect than recumbent position.
		Treatment.	{	Palliative. { Cold douches. Regulation of bowels. Avoidance of all exciting causes. Suspensory bandage. Radical cure. { Double subcutaneous ligation with fine silk. Excision.
Hydrocele.	{	General remarks.	{	Abnormal quantity of fluid in the tunica vaginalis testis. Usually unilateral; affects both sides with equal frequency. Acute variety constitutes a complication of acute inflammatory affections of testicle. Called bilocular if fluid is separated by a wall of adhesions. More frequent in tropical than cold climates. With the exception of trauma, causes not well known. Fluid almost identical with blood serum; if fluid is dark colored, it contains blood. In old cases tunica vaginalis is often much thickened.

Hydrocele (continued).	Varieties.	<ul style="list-style-type: none"> Encysted. Congenital. Infantile. Circumscribed.
	Symptoms.	<ul style="list-style-type: none"> Swelling begins in lower part of scrotum, and increases slowly in size. Swelling pyriform in shape, smooth, tense, and fluctuating. Not attended by pain or other symptoms of inflammation. Swelling projects forward; translucency. Testicle as a rule occupies posterior and lower part of scrotum.
	Differential diagnosis.	<ul style="list-style-type: none"> Hernia. Hematocele. Sarcoma of testicle. Œdema of scrotum.
	Treatment.	<ul style="list-style-type: none"> Palliative. <ul style="list-style-type: none"> Tapping. Suspensory bandage.
		<ul style="list-style-type: none"> Radical. <ul style="list-style-type: none"> Injection after tapping. Carbolic acid, 5-10 drops. Tincture iodine, 5-6 drams. This treatment contraindicated in congenital form. Incision followed by suturing of tunica to skin (Volkmann). Incision and packing with iodoform gauze (Senn). Excision of parietal layer (Bergmann). Indications for these operations.
Hematocele.	Collection of blood in tunica vaginalis from injury or disease.	
	Severe symptoms, as in hydrocele, but more sudden in its onset, and not translucent.	
	In acute cases expectant and palliative treatment.	
	In chronic cases incision and packing of cavity with iodoform gauze.	
	Castration may become necessary if testicle is seriously affected.	

DISEASES OF THE SPERMATIC CORD.

Lipoma.	Most common of all tumors of the cord.
	Occurs as a single or multiple affection.
	Operation necessary only when size of tumor inconveniences patient.

Hydrocele.	{	Diffused.	{	Development of tunica vaginalis in the fœtus. Swelling extends from internal ring to testicle. Is cylindrical or pyriform in shape and fluctuates. Occasionally translucent by transmitted light. May be mistaken for irreducible omental hernia. Treatment by injection of carbolic acid or incision and drainage. If it communicates with peritoneal cavity through small opening.
		Encysted.	{	Swelling is reduced in size when patient lies down. Swelling usually translucent and circumscribed. Injections must be used with care.
		Congenital.	{	Often complicated by hernia. Tapping and wearing of truss. Seton : should be removed in two or three days.

DISEASES OF THE SCROTUM.

Œdema.	{	Is sometimes mistaken for hydrocele. Caused by trauma, inflammation, and passive congestion. A constant concomitant of laceration of urethra superficial to Colles's fascia. Appearance of the part. In treatment causative medications must be followed.
Elephantiasis.	{	Accompanied by enormous hypertrophy of subcutaneous connective tissue. It is a disease of the lymphatics produced by filaria sanguinis hominis. Bloodless amputation.
Epithelioma.	{	Chimney-sweep's cancer. Presents all the symptoms and signs peculiar to surface epithelioma. Very rare in this country. Its frequency in England has been attributed to the use of soft coal. Only treatment early and complete excision.

- Phimosis. { Abnormal elongation of prepuce and contraction of its orifice.
More frequently congenital than acquired.
The irritation which it produces often leads to masturbation or vesical irritation.
It also interferes with the full growth and development of organ.
Balanitis and balano-posthitis as consequences.
It occasionally gives rise to chorea, epilepsy, and other functional nervous disturbances (Sayre).
It also favors the contraction of venereal disease.
- Circumcision. { Can be safely performed in the youngest children.
Antiseptic precautions should be thoroughly carried out.
Prepuce should be drawn forward, grasped by a pair of forceps in front of glans, and cut off in front of forceps.
The cuff of mucous membrane is then incised as far as corona and reflected.
Trimming of cuff to a strip one-eighth of an inch wide, followed by suturing with fine catgut.
Palmer's method of dressing.
- Inflammation. — Usually the result of extension from severe urethritis, or from a phagedenic chancre or chancroid.
- Gangrene. { Almost always the result of mechanical obstruction or of phagedena.
It occasionally follows unrelieved paraphimosis.
Line of demarcation should be waited for, and stricture of meatus and end of urethra prevented by appropriate measures.
- Epithelioma. { Is favored by long prepuce and uncleanness.
If it is limited to prepuce, typical circumcision is sufficient treatment.
If it involves the glans, amputation of penis is required.
Under such circumstances the larger part of the organ should be sacrificed.
Operation can be rendered bloodless by elastic constriction.
Urethra should be left longer than the stump, and united with circular skin flaps.
Bleeding vessels are tied.
Urethra may be slit up with scissors, and lower wall sutured to skin below, while cut edges of upper wall are sutured to corpora cavernosa.
- Amputation of entire penis. { This operation may become necessary for malignant disease.
Skin of scrotum is incised whole length of raphe (Treves).
With blunt instruments scrotum is separated down to spongy portion to the extent of half inch.
Transverse section of urethra and suturing of proximal end, slit open, to skin.
Incision around root of penis.
Separation of crura with periosteal elevator.
Completion of operation and ligation of vessels; suturing of external wound.

DISEASES AND INJURIES OF THE BREAST.

Surgical anatomy.	{	Boundaries often ill-defined, especially on axillary sides.
		Gland is included within a firm fascial envelope.
		Abscesses rarely extend beyond this firm capsule.
		Fascia of pectoralis major, serratus magnus, and external oblique separated from gland by loose connective tissue.
		Gland extends from third to sixth or seventh rib.
		Skin, superficial fascia, and capsule of gland intimately connected.
		Location and size of nipple.
		Structure and color of skin surrounding nipple.
		Description of lobules and ducts.
		Glandular epithelium lines gland vesicles and ducts.
Congenital deformities.	{	Arteries and veins.
		Course and distribution of lymphatic vessels and glands.
		Supernumerary nipples usually lie below and to inner side of normal nipple.
	{	Accessory glands are rarely functionally active.
		Absence of mammæ, a rare congenital defect.

DISEASES OF THE NIPPLE.

Inflammation.	{	Seldom met with except in connection with lactation.
		Affection usually extends to surrounding skin.
		Formation of fissures and ulcers.
		Septic lymphangitis and extension of inflammation leads to mammary abscess.
		Destruction of nipple leads to mastitis at each succeeding delivery.
		Treatment. {
	{	Aseptic precautions and use of nipple-shield.
		Local use of strong solution of borax.
		Glycerole of tannin and nitrate of silver.
Retracted nipple.	{	Use of camphorated oil and breast-pump in suspended lactation.
		Caused by cicatricial contraction or as a congenital defect.
	{	Use of breast-pump or nipple-shield.

- Paget's disease. { Chronic eczema or psoriasis of nipple in women from forty to sixty years of age.
 Appearance of skin and discharge.
 It is in reality a squamous epithelioma from the beginning.
 Disease extends along ducts to parenchyma of gland.
 As soon as gland becomes involved glandular infection occurs.
 Typical extirpation of breast and removal of axillary glands.

DISEASES OF THE BREAST.

- Neurotic affections. { Common occurrence in young unmarried women.
 Neuralgia of this organ causes severe lancinating pains, referred to axilla and arm.
 Gland overlying skin exceedingly sensitive.
 Ovarian disturbance frequently coexists.
 Diagnosis easy, when tumor is absent.
 General tonic treatment most important.
- Atrophy. — Either a congenital or acquired defect; not amenable to successful treatment.
- Hypertrophy. { Usually commences at puberty as a symmetrical affection.
 Menstruation apt to be scanty or irregular.
 It is met with in single, married, prolific, and sterile women.
 May remain stationary at any stage.
 Pain and tenderness usually absent.
 Symmetrical enlargement of organ and absence of tumors render diagnosis easy.
 General treatment and mechanical support.
 Excitation of lactation has proved successful.
 Amputation necessary only when size and weight of organ give rise to inconvenience.
- Mammitis or mastitis. { May occur at any age, or in either sex.
 Mammitis in infants a few days old.
 Acute form usually attacks nursing women during the first four weeks after delivery.
 Immediate cause often "cracked nipples."
 Infection through milk ducts and interstitial connective tissue.
- Symptoms. { Chill and fever.
 Swelling—its character and extent.
 Anatomical location of abscess.
 Varieties: interlobular, superficial, sub- or post-mammary.

Mammitis or mastitis (continued).	Treatment.	<ul style="list-style-type: none"> Prophylactic. External use of belladonna and hot fomentations. Incision and drainage. Support of gland. Curetting of fistulous tracts. Incision for post-mammary abscess.
Milk fistulæ.		<ul style="list-style-type: none"> Result either from abscess or surgeon's knife. Stimulating injections. Curetting and drainage.
Chronic inflammation.		<ul style="list-style-type: none"> Is a sequence of acute processes. Chronic suppurative from the beginning. Tuberculosis.
	Treatment.	<ul style="list-style-type: none"> General. Support of breast. Applications of belladonna and iodine. Incision and curetting of cavity and iodoform packing.
Chronic lobular in- flammation.		<ul style="list-style-type: none"> Irritable mamma. Chronic interstitial mammitis. Cicatricial tissue obstructs ducts, and obstruction leads to degeneration of parenchyma. May be mistaken for carcinoma.
	Symptoms.	<ul style="list-style-type: none"> Changes involve whole or part of gland. Affected part indurated and tender. Uterine disturbances common.
	Diagnosis.	<ul style="list-style-type: none"> No steady increase of growth. Induration circumscribed and not as hard as carcinoma. Swelling is wedge-shaped, apex toward nipple. Pain in direction of nerves (Birkett).
	Treatment.	<ul style="list-style-type: none"> Removal of functional disturbances. Belladonna plaster. Internally small doses of potassium iodide. Compression and antiseptic incisions. In neglected cases carcinoma may develop.

Tuberculosis.	{	Extension of disease to breast from neighboring parts.
		Velpeau described primary tuberculosis of this organ.
	{	Tuberculosis in other organs frequently present.
		Small cheesy foci difficult to detect.
	{	Treatment. { Early removal of entire breast.
		{ Curetting and iodoformization succeeds in some cases.
	{	{ Enlarged axillary glands should be removed.
Syphilis.	{	May extend to breast from adjacent organs.
		In secondary or tertiary syphilides primary form appears as a uniform induration of gland.
		Disease may affect one or both breasts.
		Iodide of potassium, with or without corrosive sublimate, internally.

TUMORS OF THE BREAST.

Adenoma.	{	One of the rarest of mammary neoplasms.
		Acini and ducts arranged in a confused purposeless mass.
		Unlike in carcinoma, cells are separated from connective tissue by basement membrane.
		Diagnosis. { Most frequent in married prolific women—thirty to thirty-five years of age.
	{	{ Tumor of slow growth, movable and bosselated on surface.
		{ Enlargement of glands and retraction of nipple absent.
		Free excision is the only successful treatment.
		Commonest of all benign neoplasms.
Adeno-fibroma.	{	Consist of hypertrophied connective tissue mingled with normal or altered gland tissue.
		They constitute movable, rounded, painless tumors.
		Are liable to undergo cystic degeneration; are always surrounded by a firm capsule.
		In telangiectatic variety a bloody discharge from nipple is often present.
	{	Differential diagnosis.
		Complete removal is not followed by recurrence.
		Development of this class of tumors in adenoma.
		Cysts lined with round, cuboidal, or cylindrical epithelium.
Adeno-cystoma.	{	Papillary projections into cyst from new pericanalicular connective tissue.
		This variety of cyst is called proliferous mammary cyst, and comprises 86 per cent. of all tumors.
		The tumor is distinctly encapsulated.
		Differential diagnosis; prognosis always favorable.

Adeno-sarcoma.	{ Composed of embryonal connective tissue springing from embryonal matrix. Histological structure same as in other fascia sarcomatosa. Cystic degeneration frequently present. Rapid growth characteristic of this disease. Glandular involvement seldom present. Microscope alone can determine degree of malignancy.										
Sarcoma.	{ Histological structure of tumor. Degenerative and inflammatory changes. More than one half undergo cystic degeneration. Most frequently met with in women eighteen to thirty-five years of age. Connection with mammary gland slight or absent. Usual position beneath or near nipple. Supplied with capsule; tumor round, ovoid, or lobulated. Fluctuation deceptive; veins enlarged. Sloughing, gangrene, and ulceration. Visceral metastasis occurs at an early age. Differential diagnosis. Exceedingly prone to recur even after thorough and early excision. Overlying skin should be removed with tumor as well as the entire gland and underlying connective tissue.										
Carcinoma.	<table border="0"> <tr> <td rowspan="4">Predisposing and exciting causes.</td><td colspan="2" rowspan="4"> { Heredity has some influence. Traumatism and prolonged irritation. Age—most frequent from thirty-five to fifty years. Robust health offers no immunity. Lactation and antecedent affections of the breast. </td></tr> <tr></tr> <tr></tr> <tr></tr> <tr> <td rowspan="4">Pathological anatomy.</td><td colspan="2" rowspan="4"> { Carcinoma is an atypical epithelial growth. Description of stroma and alveoli. Cells in direct relation with fibrous stroma; no limiting membrane. Ulceration. Glandular infection. </td></tr> <tr></tr> <tr></tr> <tr></tr> <tr> <td rowspan="3">Varieties.</td><td colspan="2" rowspan="3"> { Depend solely on relative proportion of fibrous tissue and epithelial cells. Scirrhus—prevalence of fibrous tissue. Encephaloid—stroma scanty. Atrophic—<i>cancer en cuirasse</i>. </td></tr> <tr></tr> <tr></tr> </table>		Predisposing and exciting causes.	{ Heredity has some influence. Traumatism and prolonged irritation. Age—most frequent from thirty-five to fifty years. Robust health offers no immunity. Lactation and antecedent affections of the breast.		Pathological anatomy.	{ Carcinoma is an atypical epithelial growth. Description of stroma and alveoli. Cells in direct relation with fibrous stroma; no limiting membrane. Ulceration. Glandular infection.		Varieties.	{ Depend solely on relative proportion of fibrous tissue and epithelial cells. Scirrhus—prevalence of fibrous tissue. Encephaloid—stroma scanty. Atrophic— <i>cancer en cuirasse</i> .	
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Carcinoma (continued).	Causes, symptoms, and termination of hard carcinoma.	{	Scirrhus forms an irregular, undulated, stony-hard, heavy mass.		
			It has no defined outline, but merges into the surrounding healthy tissue.		
			Extension of growth to skin and submammary tissue.		
			Soft carcinoma attains larger size.		
			Skin overlying tumor not thinned, but firmly attached.		
			Retraction of nipple not invariably present, and may be found in benign growths.		
			It is caused by contraction of the milk ducts.		
			Pain is absent in the earlier stages, and is of a lancinating or darting character.		
			Cachexia is present when ulceration has taken place.		
			Extension of glandular carcinoma to lymph spaces of skin and <i>vice versâ</i> .		
	Atrophic or withering carcinoma.	{	Ulceration and sloughing.		
			Involvement of axillary glands in nearly all cases at time of operation.		
			Routes of lymphatic infection; œdema of arm.		
			General infection.		
			Cicatricial contraction of abundant stroma gives rise to fatty degeneration of epithelial cells.		
			Disease does not cure itself, as has been claimed by some.		
			Virchow has shown that at the periphery of the growth the disease always remains active.		
			Diagnosis.	{	Tumor occupies frequently upper and outer segment of breast.
					Disease is most frequent in women over forty years of age.
					Attachment of tumor to skin and submammary tissue.
Retraction of nipple and glandular enlargements.					
From sarcoma it is distinguished by immobility of tumor and glandular enlargement.					
Soft carcinoma.	{	More frequently met with in young women.			
		Course more rapid, and danger of general infection greater, than in scirrhus.			
		Tumor resembles more closely a sarcoma.			
		Ulceration and sloughing are more liable to occur.			
		Pain is a late symptom, but cachexia sets in early.			
Diagnosis.	{	It differs from sarcoma in that the tumor is infiltrated, not circumscribed.			
		It is more rapid in its growth than scirrhus, and gives rise at an early stage to glandular and general infection.			
Prognosis.	{	Average duration of life in scirrhus is about thirty months.			
		Average duration of life in encephaloid is about twelve months.			
		Growth of tumor during pregnancy very rapid.			

Carcinoma (continued).	Treatment.	Internal medication of no avail in arresting the disease.	Palliative.	Always indicated in inoperable cases.
				Removal of all sources of irritation.
		Sling for arm and support for breast.		
		Locally, belladonna, opium, or conium.		
		Lotion of acetate of lead, gr. xv-℥j.		
		Ice-bags.		
		Application for ulcer—chloral, gr. v; vaseline, ℥j.		
		Esmarch's powder.		{ Morphia; Arsenious acid, āā .25; Gum arabic, 12.00.
		Internal use of morphia or other anodynes.		
		Contraindications.		{ Involvement of supraclavicular glands. Disseminated lenticular carcinoma. Metastatic carcinoma in other organs. Advanced life and slow growth of tumor. Very extensive involvement of axillary glands.
Early and thorough operation should always be done.				
Cysts.	Hydatid cysts.	Operative.	Technique.	In such cases, 10-15 per cent. of permanent cures may be expected.
				Direction and extent of incisions.
		Skin should be freely removed (Gross).		
		Always remove all the axillary glands.		
		Breast and glands should be removed in one piece.		
		Fascia covering pectoralis major and chest must be likewise removed.		
		If muscles are affected, they must be included.		
		Mr. Stiles's test.		
		In removal of axillary glands clear vein first.		
		Careful hemostasis; suturing and drainage of wound.		
After-treatment.				
The only parasitic disease of breast, and very rare.				
	Always single cyst with daughter cysts; growth very slow and painless.			
	Generally occurs in upper and outer segment of gland.			
	Value of exploratory puncture as a diagnostic test.			
Excision the only proper treatment.				

Cysts (continued).	Galactoceles or milk cysts.	<ul style="list-style-type: none"> Rare affection of breast. Results from obstruction and dilatation of milk-sinuses. Nearly always single and near nipple. Appear suddenly during lactation, and not attended by pain. Contents, milk or milk products; if milk caseates, swelling becomes firm. Treatment by incision and drainage or excision.
	Glandular cysts.	<ul style="list-style-type: none"> Single and multiple, latter more frequent. Originate usually in smaller ducts and the acini. Vary in size from pin's head to a cavity holding several ounces. Contents serous or sero-sanguinolent. Most common in women thirty-five to fifty years old. Cyst often tense, giving the tumor a solid feel. Excision is the proper treatment.
	Involution cysts.	<ul style="list-style-type: none"> Mostly occur in women past the menopause. Multiple and small in size. Pursue a slow, benign course; operation seldom indicated.
	Lymphatic cysts.	<ul style="list-style-type: none"> Described by Birkett as connective-tissue or lymph-space cysts. Are lined with endothelial cells, and contain lymph. When thin-walled, incision and packing with iodoform gauze will bring about obliteration. Thick-walled cysts should be excised.

CONTUSIONS.

Should be carefully treated to render harmless a frequent exciting cause of carcinoma.
 Evaporating and anodyne lotions.
 Supporting arm in sling.

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Resemble those in the female, only of much less frequent occurrence.
 Shuchardt's statistics of carcinoma of male breast.
 Treatment same as recommended for same affections in women.

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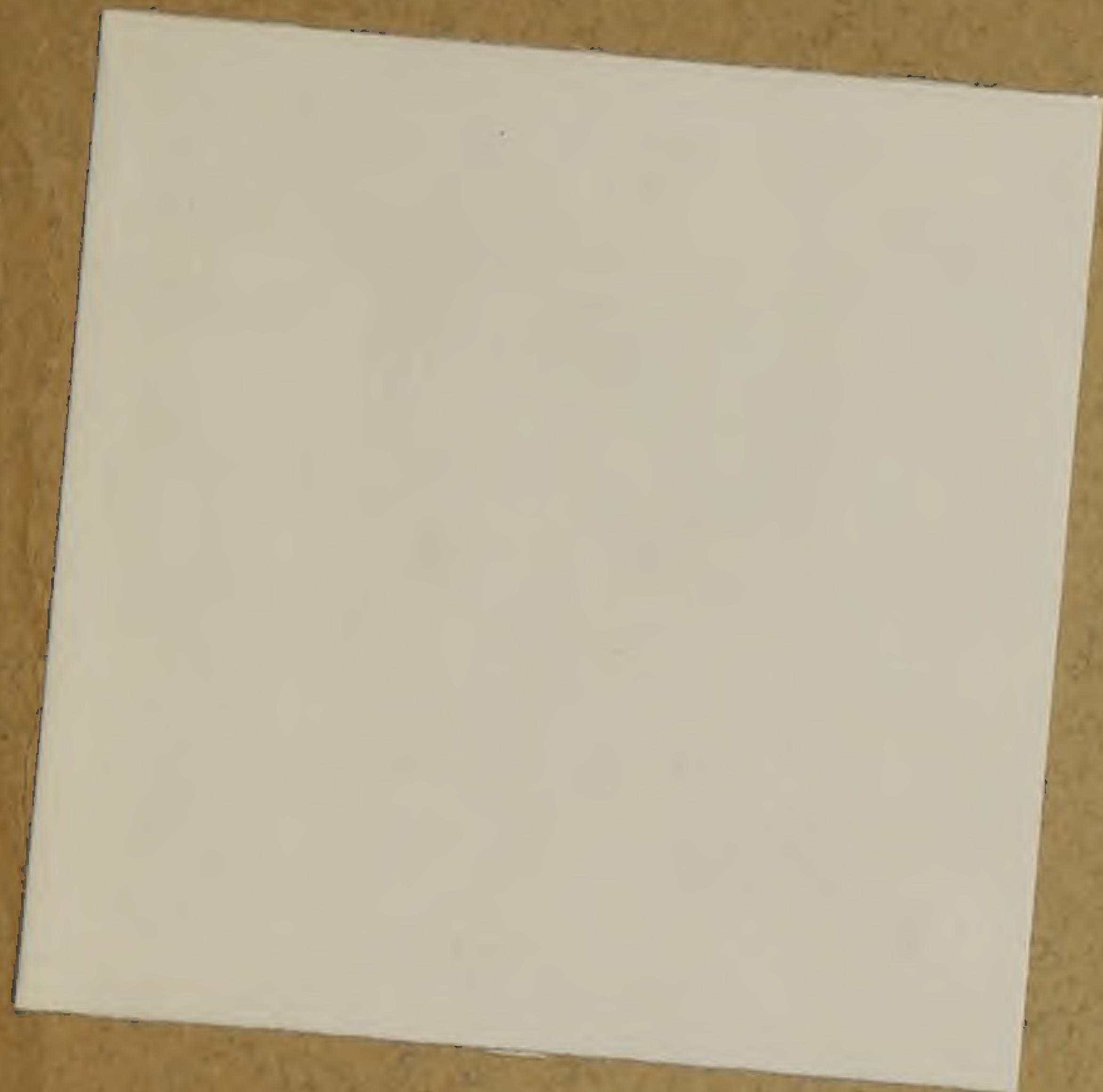
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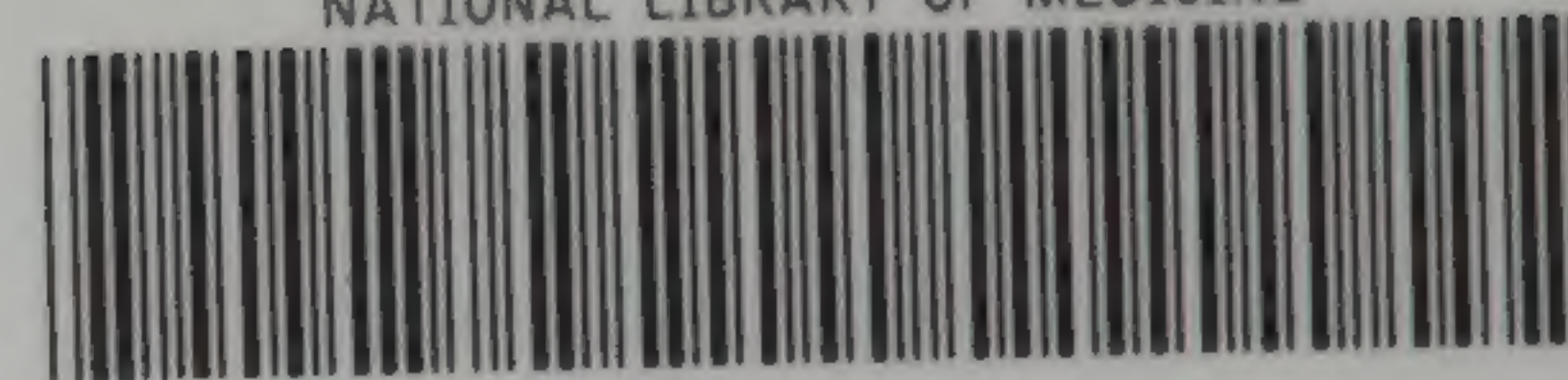
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